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Serial No. 15

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
E. LESTER JONES, Superintendent

GEODESY

TRIANGULATION ALONG THE COLUMBIA RIVER AND THE COASTS OF OREGON AND NORTHERN CALIFORNIA

BY

CHARLES A. MOURHESS
Computer, U. S. Coast and Geodetic Survey

SPECIAL PUBLICATION No. 31

WASHINGTON
GOVERNMENT PRINTING OFFICE
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TRIANGULATION ALONG THE COLUMBIA RIVER AND THE COASTS OF OREGON AND NORTHERN CALIFORNIA.

By CHARLES A. MOURHESS,

Computer, United States Coast and Geodetic Survey.

GENERAL STATEMENT.

This publication, together with Special Publication No. 13, "The California-Washington Arc of Primary Triangulation," gives all of the data of this Bureau for the State of Oregon. The results of this work are of great practical value to the engineer and geographer. To these it gives a large number of marked and described points, determined trigonometrically and all computed and adjusted on the same standard geodetic datum, known as the North American Datum.

The triangulation contained in this publication is of two grades of accuracy, secondary and tertiary. The secondary triangulation has an average triangle closing error of 3 seconds or less, while the tertiary or general coast triangulation has a triangle closing error of about 5 seconds.

The scheme for the trigonometric control of the coast of Oregon is, perhaps, as nearly ideal as it is possible to find anywhere in the United States. The California-Washington Arc of Primary Triangulation is the backbone of this control, and from this as a base comes the secondary work, which joins the several detached pieces of tertiary work along the coast, and upon which all the coast and river triangulation in Oregon depends.

The greater portion of this volume is taken up with the actual results of the triangulation, namely, the lists of geographic positions, the descriptions of stations, and the table of elevations. The details of the field and office work are, in general, omitted as being of insufficient importance to warrant their publication.

The index at the end of the book when used in connection with the sketches makes it possible to easily and quickly locate any or all stations for any particular locality, with their geographic positions and descriptions, and elevations when known. All of the descriptions available are given as completely as possible, and the remaining stations are nearly always sufficiently described by their names, as given on the sketches and in the table of geographic positions.

The difficulties of accurately locating and permanently defining any particular point, even with the aid of monuments and other points of reference, are often great, judging from disputes arising from this source. However, this is not true when a point is located by its geographic position, that is, by means of its longitude and latitude.

There is only one point on the earth's surface at the intersection of any one parallel of latitude and any one meridian of longitude, and therefore there can be no dispute as to the

meaning of such a geographic definition of the location of a point, even though all the original triangulation station marks used in its determination, together with the chart on which its position was originally plotted, have been totally destroyed.

In the case of the destruction of an original triangulation station mark, or any other point defined by a geographic position, a competent geodetic engineer can reestablish its exact location by means of a new system of triangulation connecting with other distant triangulation station marks which have not been destroyed. In the case of the destruction of the chart on which the position of any such point on the earth's surface was originally plotted, this point can be replotted by its geographic position with any degree of accuracy permitted by the scale of any new chart constructed for that purpose.

If there be no question at the time of the original location and legal adoption of a geographic definition of the location of a point by a given latitude and longitude, there can be no technical or legal question afterwards as to its exact meaning, or as to the exact redetermination of the location of this point, be it either on land or water at its newly determined position, or on a new chart in its newly plotted position.

Triangulation which has been done many years prior to the date of publication of its results is greatly reduced in value to the engineer and geographer by the loss of stations, due to the changes in topography, to buildings and improvements, or to the cultivation of the land. On account of the loss of surface marks or from other causes, the engineer may in many cases fail to recover a station which still exists, when by digging at the proper place the mark could be found and the station recovered. Without the guidance of the original topography or the reference marks the station can only be recovered by locating a new point in the immediate vicinity of the old one by means of triangulation carried from the nearest available triangulation stations. Knowing the positions on the same datum of both the old and new points, a distance and direction can be computed from the new point to the old, and measurements made on the ground will show the location of the old station.

In 1852 the first triangulation was begun on the Columbia River. Following this several important detached areas were covered by triangulation, the work on which has been continued intermittently until the present time. However, it was not until after the completion of the California-Washington Arc of Primary Triangulation that any of this work could be computed on the North American Datum. Even then there remained nearly all of the coast, which it was necessary to unite by means of the secondary triangulation before it could be finally placed on the standard datum.

THE SECONDARY TRIANGULATION.

In order to connect and control in a suitable manner the several separate pieces of triangulation along the coast, it was found necessary to use the secondary triangulation. This connects with the primary at two points in Oregon. From the primary line Mary–Roman it connects directly to the coast, a branch to the south connecting with the Umpqua River and the principal branch to the north connecting at frequent intervals with the coast triangulation as far as Tillamook Bay. Here it joins some of the older work which is considered to be of the same degree of accuracy. There are several figures of this old work reaching to the mouth of the Columbia River. From there north to Willapa Bay, Wash., and thence east to the primary triangulation just south of Tacoma there is a scheme of secondary work.

From the primary line White–Onion there is a continuous system of secondary triangulation south to the Klamath River, Cal. This joins frequently to the coast work and forms a strong control.

THE TERTIARY TRIANGULATION.

The tertiary triangulation contained in this publication falls naturally into three general divisions—the Columbia River, the coast of Oregon, and the coast of California—and they will be taken up briefly in that order.

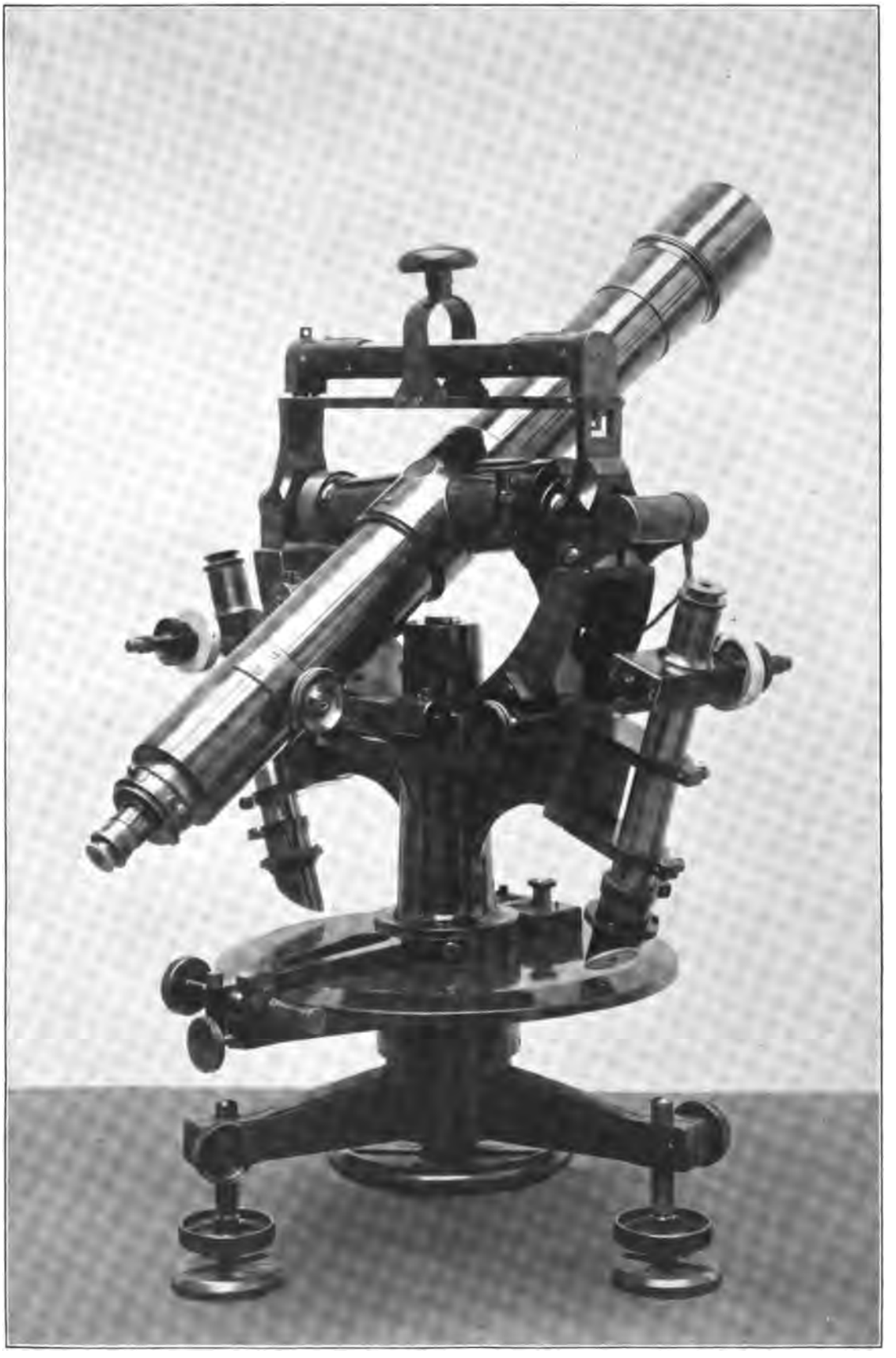

FIG. 1.—THE 8-INCH POSITION INSTRUMENT USED ON THE SECONDARY TRIANGULATION.

The original triangulation of the Columbia River consisted of rather large figures with most of the stations on the hills some distance from the river. At present these stations can generally be recovered only with great difficulty. The more recent triangulation consists of smaller figures with the stations all close to the banks of the river. It is probable that the banks have eroded or will erode in such a manner as to destroy many of the station marks, but in such places reference marks were placed well back from the banks, and their geographic positions have been computed and follow the positions of the stations in the table of positions. The United States Army Engineers' triangulation has been computed on the standard datum by this office and is included in this publication. This work consisted originally of a single chain of triangles, but in 1913 an officer of this Survey used these stations, observed enough additional lines to give a complete check on the work, located prominent objects and aids to navigation, re-marked some of the stations, and connected the scheme at several points to the triangulation of this Survey. The United States Army Engineers' triangulation of the Columbia River is well up to the standard of similar work of the Coast and Geodetic Survey.

The triangulation along the coast of Oregon consisted originally of several detached pieces, each independent of the other, and on separate astronomic data. In some cases these were expanded until they met, but it was not until they were all connected with each other by the secondary triangulation that it was possible to place them on the North American Datum. In Coos Bay the United States Army Engineers have a system of triangulation based on the work of the Coast and Geodetic Survey. This work has been computed on the standard datum by this office, and is here published along with the other results. In some places it has become necessary to replace the old work by new triangulation, and in every such case the new work depends upon two or more of the old stations. The accuracy of this work is comparable with other coast work in the United States, usually classed as tertiary. The probable error of the length is less than 1 part in 5,000, except between side points or between intersection points near together and determined from distant stations, where the error is likely to exceed this amount.

The triangulation on the coast of California south to Trinidad Head is, on the whole, of a less accurate character than other coast triangulation in the United States. This is due mainly to the unfavorable natural conditions which would not allow well-shaped figures. In some cases the triangulation was allowed to degenerate to single triangles with only two of the angles measured. The field work was done under methods now largely superseded. The work is of sufficient accuracy for topographic purposes, but in no case should other triangulation be based on this old work. When new triangulation over this section is undertaken by this Survey it will be based directly upon the secondary triangulation, which is only a short distance inland.

ADJUSTMENT OF THE TRIANGULATION.

As has been stated, all of the positions in Oregon depend upon the California-Washington Arc of Primary Triangulation. This connects directly with the Columbia River triangulation at Portland. The positions of the stations at the mouth of the river are fixed by the secondary triangulation through Washington, not included in this publication, which is based on the primary triangle Rain–Hurst–Hal. The discrepancies produced by closing this loop were distributed along the Columbia River, as this work was considered to be very much less accurate than the secondary triangulation. The United States Army Engineer's triangulation was adjusted to fit between the stations of the old survey, with which it was connected.

The northern section of the secondary triangulation based on the primary line Mary–Roman was held fixed as computed, no discrepancies being distributed through it. The discrepancies due to the loop closure were distributed in the old work north of the Tillamook Bay and in the secondary work from the Columbia River to the primary triangle Rain–Hurst–Hal.

The southern section of the secondary work based on the line White–Onion of the primary triangulation was adjusted in several sections. As there is no loop closure with the primary there are no discrepancies due to this cause.

All tertiary work was adjusted to fit the secondary, and all discrepancies due to loop closures, measured bases, or azimuths, were eliminated.

THE NORTH AMERICAN DATUM.

Early in the year 1913 the Superintendent of the United States Coast and Geodetic Survey was notified by the director of the Comisión Geodésica Mexicana and by the chief astronomer of the Dominion of Canada Astronomical Observatory that the so-called United States Standard Datum had been adopted as the datum for the triangulation of those organizations. They also reported that the Clarke Spheroid of 1866, now used in the United States, would be used by them.

Owing to the international character of the datum now adopted by the three countries, the Superintendent of the United States Coast and Geodetic Survey has changed its designation from the "United States Standard Datum" to the "North American Datum."

EXPLANATION OF THE NORTH AMERICAN DATUM.

All of the positions and azimuths have been computed upon the Clarke Spheroid of 1866, as expressed in meters, which has been in use in the Coast and Geodetic Survey for many years.

After a spheroid has been adopted and all the angles and lengths in a triangulation have been fully fixed, it is still necessary, before the computation of latitudes, longitudes, and azimuths can be made, to adopt a standard latitude and longitude for a specified station and a standard azimuth of a line from that station. For convenience, the adopted standard position (latitude and longitude) of a given station, together with the adopted standard azimuth of a line from that station, is called the geodetic datum.

The primary triangulation in the United States was commenced at various points and existed at first as a number of detached portions in each of which the geodetic datum was necessarily dependent only upon the astronomic stations connected with that particular portion. As examples of such detached portions of triangulation there may be mentioned the early triangulation in New England and along the Atlantic coast, a detached portion of the transcontinental triangulation centering on St. Louis and another portion of the same triangulation in the Rocky Mountain region, and three separate portions of triangulation in California, in the latitude of San Francisco, in the vicinity of Santa Barbara Channel, and in the vicinity of San Diego. With the lapse of time these separate pieces expanded until they touched or overlapped.

The transcontinental triangulation, of which the office computation was completed in 1899, joined all of the detached portions mentioned and made them one continuous triangulation. As soon as this took place the logical necessity existed of discarding the old geodetic data used in these various pieces and substituting one for the whole country, or at least for as much of the country as is covered by continuous triangulation. To do this was a very heavy piece of work, and involved much preliminary study to determine the best datum to be adopted. On March 13, 1901, the Superintendent adopted what was known from that time until 1913 as the United States Standard Datum, but is now known as the North American Datum (see above), and it was decided to reduce the positions to that datum as rapidly as possible. The datum adopted was that formerly in use in New England, and therefore its adoption did not affect the positions which had been used for geographic purposes in New England and along the Atlantic coast to North Carolina, nor those in the States of New York, Pennsylvania, New Jersey, and Delaware. The adopted datum does not agree, however, with that used in The Transcontinental Triangulation and in The Eastern Oblique Arc of the United States, publications which deal primarily with the purely scientific problem of the determination of the figure of the earth and which were prepared for publication before the adoption of the new datum.

As the adoption of such a standard datum was a matter of considerable importance, it is in order here to explain the desirability of this step more fully.

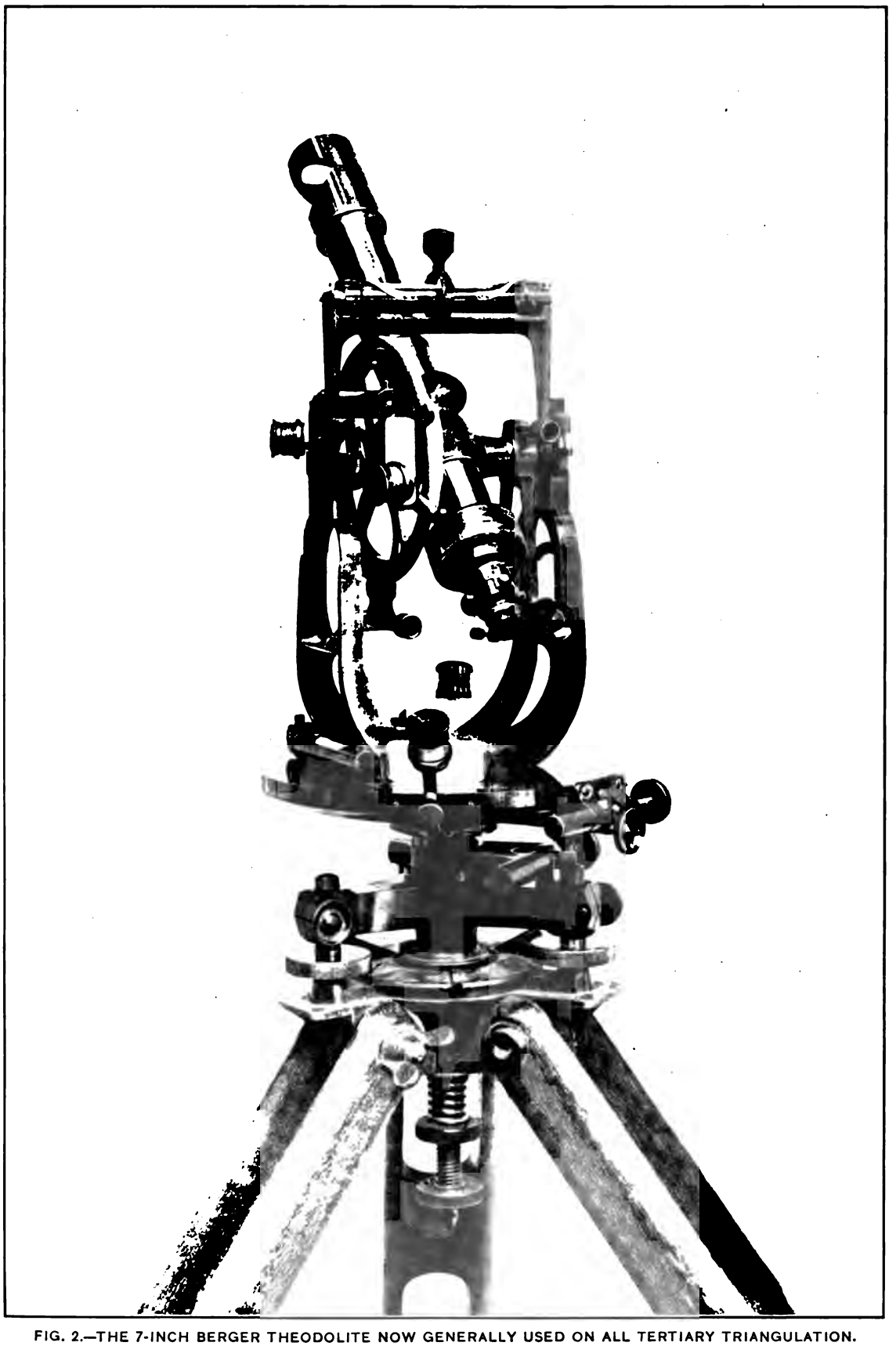

FIG. 2.—THE 7-INCH BERGER THEODOLITE NOW GENERALLY USED ON ALL TERTIARY TRIANGULATION.

The main objects to be attained by the geodetic operations of the Coast and Geodetic Survey are, first, the control of the charts published by the Survey; second, the furnishing of geographic positions (latitudes and longitudes), of accurately determined elevations, and of distances and azimuths, to officers connected with the Coast and Geodetic Survey and to other organizations; third, the determination of the figure of the earth. For the first and second objects it is not necessary that the reference spheroid should be accurately that which most closely fits the geoid within the area covered, nor that the adopted geodetic datum should be absolutely the best that can be derived from the astronomic observations at hand. It is simply desirable that the reference spheroid and the geodetic datum adopted shall be, if possible, such a close approximation to the truth that any correction which may hereafter be derived from the observations which are now or may become available shall not greatly exceed the probable errors of such corrections. It is, however, very desirable that one spheroid and one geodetic datum be used for the whole country. In fact, this is absolutely necessary if a geodetic survey is to perform fully the function of accurately coordinating all surveys within the area which it covers. This is the most important function of a geodetic survey. To perform this function, it is also highly desirable that when a certain spheroid and geodetic datum have been adopted for a country they be rigidly adhered to, without change, for all time, unless shown to be largely in error.

In striving to attain the third object, the determination of the figure of the earth, the conditions are decidedly different. This problem concerns itself primarily with astronomic observations of latitude, longitude, and azimuth, and with the geodetic positions of the points at which the astronomic observations were made, but is not concerned with the geodetic positions of other points fixed by the triangulations. The geodetic positions (latitudes and longitudes) of comparatively few points are therefore concerned in this problem. However, in marked contrast to the statements made in preceding paragraphs, it is desirable in dealing with this problem that, with each new important accession of data, a new spheroid fitting the geoid with the greatest possible accuracy, and new values of the geodetic latitudes, longitudes, and azimuths of the highest degree of accuracy should be derived.

The United States Standard (now the North American) Datum was adopted with reference to positions furnished for geographic purposes, but has no reference to the problem of the determination of the figure of the earth. It is adopted with reference to the engineer's problem of furnishing standard positions and does not affect the scientist's problem of the determination of the figure of the earth.

The principles which guided in the selection of the datum to be adopted were: First, that the adopted datum should not differ widely from the ideal datum for which the sum of the station errors in latitude, longitude, and azimuth should each be zero; second, it was desirable that the adopted datum should produce minimum changes in the publications of the Survey, including its charts; and, third, it was desirable, other things being equal, to adopt that datum which allowed the maximum number of positions already in the office registers to remain unchanged, and therefore necessitated a minimum amount of new computation. These considerations led to the adoption, as the standard, of that datum which had been in use for many years in the northeastern group of States and along the Atlantic coast as far south as North Carolina.

An examination of the station errors available in 1903 on the United States Standard Datum at 246 latitude stations, 76 longitude stations, and 152 azimuth stations, scattered widely over the United States from Maine to Louisiana and to California, indicated that this datum approaches closely the ideal with which the algebraic sum of the station errors of each class would be zero.[1]

[1] This is further borne out in the reduction of 765 astronomic stations in connection with the "Supplementary investigation in 1909 of the figure of the earth and isostasy," by J. F. Hayford, published by the Coast and Geodetic Survey.

The North American Datum, upon which the positions and azimuths given in this publication depend, may be defined in terms of the position of the station Meades Ranch as follows:

	°	′	″
ϕ =	39	13	26.686
λ =	98	32	30.506
α to Waldo =	75	28	14.52

Points are then said to be upon the North American Datum when they are connected with the station Meades Ranch by a continuous triangulation, through which the corresponding latitudes, longitudes, and azimuths have been computed on the Clarke spheroid of 1866, as expressed in meters, starting from the above data.

The principal lists of geographic positions published on the adopted datum throughout the whole United States are contained in the following publications of the Coast and Geodetic Survey and of other organizations:

Appendix 8 of the Report for 1885, positions in Massachusetts and Rhode Island.
Appendix 8 of the Report for 1888, positions in Connecticut.
Appendix 8 of the Report for 1893, positions in Pennsylvania, Delaware, and Maryland.
Appendix 10 of the Report for 1894, positions in Massachusetts.
Appendix 6 of the Report for 1901, positions in Kansas and Nebraska.
Appendix 3 of the Report for 1902, positions in Kansas, Missouri, Nebraska, and Colorado.
Appendix 4 of the Report for 1903, positions in Kansas, Oklahoma, and Texas.
Appendix 9 of the Report for 1904, positions in California.
Appendix 5 of the Report for 1905, positions in Texas.
Appendix 3 of the Report for 1907, positions in California.
Appendix 5 of the Report for 1910, positions in California.
Appendix 4 of the Report for 1911, positions in Nebraska, Minnesota, North Dakota, and South Dakota.
Appendix 5 of the Report for 1911, positions in Texas.
Appendix 6 of the Report for 1911, positions in Florida.
Special Publication No. 11, positions in Texas, New Mexico, Arizona, and California.
Special Publication No. 13, positions in California, Oregon, and Washington.
Special Publication No. 16, positions in Florida.
Special Publication No. 17, positions in Texas.
Special Publication No. 19, position in Colorado, Utah, Nevada, Wyoming, Montana, South Dakota, and North Dakota.
Special Publication No. 24, positions in Alabama and Mississippi.
Special Publication No. 30, positions in West Virginia, Ohio, Kentucky, Indiana, Illinois, and Missouri.
Special Publication No. 31, positions in Oregon, Washington, and California.
Appendix EEE, pages 2905–3031, Annual Report of the Chief of Engineers, 1902, positions of points on and near the Great Lakes.
Publications of the Massachusetts Harbor and Land Commission.
Various bulletins of the United States Geological Survey.

EXPLANATION OF TABLES OF POSITIONS.

In the tables of positions the latitude and longitude of each point are given on the North American Datum (see p. 8), also the length and azimuth of each line observed over, whether in one or both ways. Along with the latitude and longitude of each point the lengths and azimuths are given of lines from that point to other points of the triangulation. No lengths or azimuths are repeated, and for a given line the length and azimuth will generally be found opposite the position of the last-mentioned of the two stations involved.

For the convenience of the draftsman a column of "seconds in meters" is given, in which is placed the length (in meters) of each small arc of a meridian or parallel corresponding to the seconds of the given latitude or longitude. To facilitate further the use of the tables, a column is given of the logarithms of the lengths. It must be remembered that it is the logarithm which is derived first from the computation, the lengths given in this table being then derived from the corresponding logarithms.

The rule followed in recent publications of this office has been to give latitudes and longitudes to thousandths of seconds for all points the positions of which are fixed by fully adjusted

triangulation. Points, the positions of which are given to hundredths of seconds only, are marked by footnotes as being without check (observed from only two stations) or checked by verticals only.

In the columns giving azimuths, distances, and logarithms of distances, the accuracy is indicated to a certain extent by the number of decimal places given, it being understood that in each case two doubtful figures are given. In some cases there is very little doubt of the correctness of the second figure from the right, while in a few cases some doubt may be cast on the third figure from the right.

These tables may be conveniently consulted by using as finders the 34 sketches and the index at the end of this publication. In the third column of the index will be found for each point a reference to the page on which its description is given, in the fourth column the page on which its elevation above sea level will be found, and in the fifth column the number of the sketch on which it appears.

The following conversion tables are inserted for the convenience of those who may wish to convert the distances or elevations given in this publication from meters to feet or from feet to meters.

Lengths—Feet to meters (from 1 to 1,000 units).

[Reduction factor: 1 foot = 0.3048006096 meter.]

Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.
0		100	30.48006	200	60.96012	300	91.44018	400	121.92024	500	152.40030	600	182.88037	700	213.36043	800	243.84049	900	274.32055
1	.30480	1	30.78486	1	61.26492	1	91.74498	1	122.22504	1	152.70511	1	183.18517	1	213.66523	1	244.14529	1	274.62535
2	.60960	2	31.08966	2	61.56972	2	92.04978	2	122.52985	2	153.00991	2	183.48997	2	213.97003	2	244.45009	2	274.93015
3	.91440	3	31.39446	3	61.87452	3	92.35458	3	122.83465	3	153.31471	3	183.79477	3	214.27483	3	244.75489	3	275.23495
4	1.21920	4	31.69926	4	62.17932	4	92.65939	4	123.13945	4	153.61951	4	184.09957	4	214.57963	4	245.05969	4	275.53975
5	1.52400	5	32.00406	5	62.48412	5	92.96419	5	123.44425	5	153.92431	5	184.40437	5	214.88443	5	245.36449	5	275.84455
6	1.82880	6	32.30886	6	62.78893	6	93.26899	6	123.74905	6	154.22911	6	184.70917	6	215.18923	6	245.66929	6	276.14935
7	2.13360	7	32.61367	7	63.09373	7	93.57379	7	124.05385	7	154.53391	7	185.01397	7	215.49403	7	245.97409	7	276.45415
8	2.43840	8	32.91847	8	63.39853	8	93.87859	8	124.35865	8	154.83871	8	185.31877	8	215.79883	8	246.27889	8	276.75895
9	2.74321	9	33.22327	9	63.70333	9	94.18339	9	124.66345	9	155.14351	9	185.62357	9	216.10363	9	246.58369	9	277.06375
10	3.04801	110	33.52807	210	64.00813	310	94.48819	410	124.96825	510	155.44831	610	185.92837	710	216.40843	810	246.88849	910	277.36855
1	3.35281	1	33.83287	1	64.31293	1	94.79299	1	125.27305	1	155.75311	1	186.23317	1	216.71323	1	247.19329	1	277.67336
2	3.65761	2	34.13767	2	64.61773	2	95.09779	2	125.57785	2	156.05791	2	186.53797	2	217.01803	2	247.49810	2	277.97816
3	3.96241	3	34.44247	3	64.92253	3	95.40259	3	125.88265	3	156.36271	3	186.84277	3	217.32283	3	247.80290	3	278.28296
4	4.26721	4	34.74727	4	65.22733	4	95.70739	4	126.18745	4	156.66751	4	187.14757	4	217.62764	4	248.10770	4	278.58776
5	4.57201	5	35.05207	5	65.53213	5	96.01219	5	126.49225	5	156.97231	5	187.45237	5	217.93244	5	248.41250	5	278.89256
6	4.87681	6	35.35687	6	65.83693	6	96.31699	6	126.79705	6	157.27711	6	187.75718	6	218.23724	6	248.71730	6	279.19736
7	5.18161	7	35.66167	7	66.14173	7	96.62179	7	127.10185	7	157.58192	7	188.06198	7	218.54204	7	249.02210	7	279.50216
8	5.48641	8	35.96647	8	66.44653	8	96.92659	8	127.40665	8	157.88672	8	188.36678	8	218.84684	8	249.32690	8	279.80696
9	5.79121	9	36.27127	9	66.75133	9	97.23139	9	127.71146	9	158.19152	9	188.67158	9	219.15164	9	249.63170	9	280.11176
20	6.09601	120	36.57607	220	67.05613	320	97.53620	420	128.01626	520	158.49632	620	188.97638	720	219.45644	820	249.93650	920	280.41656
1	6.40081	1	36.88087	1	67.36093	1	97.84100	1	128.32106	1	158.80112	1	189.28118	1	219.76124	1	250.24130	1	280.72136
2	6.70561	2	37.18567	2	67.66574	2	98.14580	2	128.62586	2	159.10592	2	189.58598	2	220.06604	2	250.54610	2	281.02616
3	7.01041	3	37.49047	3	67.97054	3	98.45060	3	128.93066	3	159.41072	3	189.89078	3	220.37084	3	250.85090	3	281.33096
4	7.31521	4	37.79528	4	68.27534	4	98.75540	4	129.23546	4	159.71552	4	190.19558	4	220.67564	4	251.15570	4	281.63576
5	7.62002	5	38.10008	5	68.58014	5	99.06020	5	129.54026	5	160.02032	5	190.50038	5	220.98044	5	251.46050	5	281.94056
6	7.92482	6	38.40488	6	68.88494	6	99.36500	6	129.84506	6	160.32512	6	190.80518	6	221.28524	6	251.76530	6	282.24536
7	8.22962	7	38.70968	7	69.18974	7	99.66980	7	130.14986	7	160.62992	7	191.10998	7	221.59004	7	252.07010	7	282.55017
8	8.53442	8	39.01448	8	69.49454	8	99.97460	8	130.45466	8	160.93472	8	191.41478	8	221.89484	8	252.37490	8	282.85497
9	8.83922	9	39.31928	9	69.79934	9	100.27940	9	130.75946	9	161.23952	9	191.71958	9	222.19964	9	252.67971	9	283.15977
30	9.14402	130	39.62408	230	70.10414	330	100.58420	430	131.06426	530	161.54432	630	192.02438	730	222.50445	830	252.98451	930	283.46457
1	9.44882	1	39.92888	1	70.40894	1	100.88900	1	131.36906	1	161.84912	1	192.32918	1	222.80925	1	253.28931	1	283.76937
2	9.75362	2	40.23368	2	70.71374	2	101.19380	2	131.67386	2	162.15392	2	192.63398	2	223.11405	2	253.59411	2	284.07417
3	10.05842	3	40.53848	3	71.01854	3	101.49860	3	131.97866	3	162.45872	3	192.93879	3	223.41885	3	253.89891	3	284.37897
4	10.36323	4	40.84328	4	71.32334	4	101.80340	4	132.28346	4	162.76353	4	193.24359	4	223.72365	4	254.20371	4	284.68377
5	10.66803	5	41.14808	5	71.62814	5	102.10820	5	132.58827	5	163.06833	5	193.54839	5	224.02845	5	254.50851	5	284.98857
6	10.97283	6	41.45288	6	71.93294	6	102.41300	6	132.89307	6	163.37313	6	193.85319	6	224.33325	6	254.81331	6	285.29337
7	11.27763	7	41.75768	7	72.23774	7	102.71781	7	133.19787	7	163.67793	7	194.15799	7	224.63805	7	255.11811	7	285.59817
8	11.58243	8	42.06248	8	72.54255	8	103.02261	8	133.50267	8	163.98273	8	194.46279	8	224.94285	8	255.42291	8	285.90297
9	11.88723	9	42.36728	9	72.84735	9	103.32741	9	133.80747	9	164.28753	9	194.76759	9	225.24765	9	255.72771	9	286.20777
40	12.19203	140	42.67209	240	73.15215	340	103.63221	440	134.11227	540	164.59233	640	195.07239	740	225.55245	840	256.03251	940	286.51257
1	12.49683	1	42.97689	1	73.45695	1	103.93701	1	134.41707	1	164.89713	1	195.37719	1	225.85725	1	256.33731	1	286.81737
2	12.80163	2	43.28169	2	73.76175	2	104.24181	2	134.72187	2	165.20193	2	195.68199	2	226.16205	2	256.64211	2	287.12217
3	13.10643	3	43.58649	3	74.06655	3	104.54661	3	135.02667	3	165.50673	3	195.98679	3	226.46685	3	256.94691	3	287.42697
4	13.41123	4	43.89129	4	74.37135	4	104.85141	4	135.33147	4	165.81153	4	196.29159	4	226.77165	4	257.25171	4	287.73178
5	13.71603	5	44.19609	5	74.67615	5	105.15621	5	135.63627	5	166.11633	5	196.59639	5	227.07645	5	257.55652	5	288.03658
6	14.02083	6	44.50089	6	74.98095	6	105.46101	6	135.94107	6	166.42113	6	196.90119	6	227.38125	6	257.86132	6	288.34138
7	14.32563	7	44.80569	7	75.28575	7	105.76581	7	136.24587	7	166.72593	7	197.20599	7	227.68606	7	258.16612	7	288.64618
8	14.63043	8	45.11049	8	75.59055	8	106.07061	8	136.55067	8	167.03073	8	197.51080	8	227.99086	8	258.47092	8	288.95098
9	14.93523	9	45.41529	9	75.89535	9	106.37541	9	136.85547	9	167.33553	9	197.81560	9	228.29566	9	258.77572	9	289.25578

50	15.24003	150	45.72009	250	76.20015	350	106.68021	450	137.16027	550	167.64034	650	198.12040	750	228.60046	850	259.08052	950	289.56058
1	15.54483	1	46.02489	1	76.50495	1	106.98501	1	137.46507	1	167.94514	1	198.42520	1	228.90526	1	259.38532	1	289.86538
2	15.84963	2	46.32969	2	76.80975	2	107.28981	2	137.76988	2	168.24994	2	198.73000	2	229.21006	2	259.69012	2	290.17018
3	16.15443	3	46.63449	3	77.11455	3	107.59462	3	138.07468	3	168.55474	3	199.03480	3	229.51486	3	259.99492	3	290.47498
4	16.45923	4	46.93929	4	77.41935	4	107.89942	4	138.37948	4	168.85954	4	199.33960	4	229.81966	4	260.29972	4	290.77978
5	16.76403	5	47.24409	5	77.72416	5	108.20422	5	138.68428	5	169.16434	5	199.64440	5	230.12446	5	260.60452	5	291.08458
6	17.06883	6	47.54890	6	78.02896	6	108.50902	6	138.98908	6	169.46914	6	199.94920	6	230.42926	6	260.90932	6	291.38938
7	17.37363	7	47.85370	7	78.33376	7	108.81382	7	139.29388	7	169.77394	7	200.25400	7	230.73406	7	261.21412	7	291.69418
8	17.67844	8	48.15850	8	78.63856	8	109.11862	8	139.59868	8	170.07874	8	200.55880	8	231.03886	8	261.51892	8	291.99898
9	17.98324	9	48.46330	9	78.94336	9	109.42342	9	139.90348	9	170.38354	9	200.86360	9	231.34366	9	261.82372	9	292.30378
60	18.28804	160	48.76810	260	79.24816	360	109.72822	460	140.20828	560	170.68834	660	201.16840	760	231.64846	860	262.12852	960	292.60858
1	18.59284	1	49.07290	1	79.55296	1	110.03302	1	140.51308	1	170.99314	1	201.47320	1	231.95326	1	262.43332	1	292.91339
2	18.89764	2	49.37770	2	79.85776	2	110.33782	2	140.81788	2	171.29794	2	201.77800	2	232.25806	2	262.73813	2	293.21819
3	19.20244	3	49.68250	3	80.16256	3	110.64262	3	141.12268	3	171.60274	3	202.08280	3	232.56287	3	263.04293	3	293.52299
4	19.50724	4	49.98730	4	80.46736	4	110.94742	4	141.42748	4	171.90754	4	202.38760	4	232.86767	4	263.34773	4	293.82779
5	19.81204	5	50.29210	5	80.77216	5	111.25222	5	141.73228	5	172.21234	5	202.69241	5	233.17247	5	263.65253	5	294.13259
6	20.11684	6	50.59690	6	81.07696	6	111.55702	6	142.03708	6	172.51714	6	202.99721	6	233.47727	6	263.95733	6	294.43739
7	20.42164	7	50.90170	7	81.38176	7	111.86182	7	142.34188	7	172.82195	7	203.30201	7	233.78207	7	264.26213	7	294.74219
8	20.72644	8	51.20650	8	81.68656	8	112.16662	8	142.64669	8	173.12675	8	203.60681	8	234.08687	8	264.56693	8	295.04699
9	21.03124	9	51.51130	9	81.99136	9	112.47142	9	142.95149	9	173.43155	9	203.91161	9	234.39167	9	264.87173	9	295.35179
70	21.33604	170	51.81610	270	82.29616	370	112.77623	470	143.25629	570	173.73635	670	204.21641	770	234.69647	870	265.17653	970	295.65659
1	21.64084	1	52.12090	1	82.60097	1	113.08103	1	143.56109	1	174.04115	1	204.52121	1	235.00127	1	265.48133	1	295.96139
2	21.94564	2	52.42570	2	82.90577	2	113.38583	2	143.86589	2	174.34595	2	204.82601	2	235.30607	2	265.78613	2	296.26619
3	22.25044	3	52.73051	3	83.21057	3	113.69063	3	144.17069	3	174.65075	3	205.13081	3	235.61087	3	266.09093	3	296.57099
4	22.55525	4	53.03531	4	83.51537	4	113.99543	4	144.47549	4	174.95555	4	205.43561	4	235.91567	4	266.39573	4	296.87579
5	22.86005	5	53.34011	5	83.82017	5	114.30023	5	144.78029	5	175.26035	5	205.74041	5	236.22047	5	266.70053	5	297.18059
6	23.16485	6	53.64491	6	84.12497	6	114.60503	6	145.08509	6	175.56515	6	206.04521	6	236.52527	6	267.00533	6	297.48539
7	23.46965	7	53.94971	7	84.42977	7	114.90983	7	145.38989	7	175.86995	7	206.35001	7	236.83007	7	267.31013	7	297.79020
8	23.77445	8	54.25451	8	84.73457	8	115.21463	8	145.69469	8	176.17475	8	206.65481	8	237.13487	8	267.61494	8	298.09500
9	24.07925	9	54.55931	9	85.03937	9	115.51943	9	145.99949	9	176.47955	9	206.95961	9	237.43967	9	267.91974	9	298.39980
80	24.38405	180	54.86411	280	85.34417	380	115.82423	480	146.30429	580	176.78435	680	207.26441	780	237.74448	880	268.22454	980	298.70460
1	24.68885	1	55.16891	1	85.64897	1	116.12903	1	146.60909	1	177.08915	1	207.56922	1	238.04928	1	268.52934	1	299.00940
2	24.99365	2	55.47371	2	85.95377	2	116.43383	2	146.91389	2	177.39395	2	207.87402	2	238.35408	2	268.83414	2	299.31420
3	25.29845	3	55.77851	3	86.25857	3	116.73863	3	147.21869	3	177.69876	3	208.17882	3	238.65888	3	269.13894	3	299.61900
4	25.60325	4	56.08331	4	86.56337	4	117.04343	4	147.52350	4	178.00356	4	208.48362	4	238.96368	4	269.44374	4	299.92380
5	25.90805	5	56.38811	5	86.86817	5	117.34823	5	147.82830	5	178.30836	5	208.78842	5	239.26848	5	269.74854	5	300.22860
6	26.21285	6	56.69291	6	87.17297	6	117.65304	6	148.13310	6	178.61316	6	209.09322	6	239.57328	6	270.05334	6	300.53340
7	26.51765	7	56.99771	7	87.47777	7	117.95784	7	148.43790	7	178.91796	7	209.39802	7	239.87808	-7	270.35814	7	300.83820
8	26.82245	8	57.30251	8	87.78258	8	118.26264	8	148.74270	8	179.22276	8	209.70282	8	240.18288	8	270.66294	8	301.14300
9	27.12725	9	57.60732	9	88.08738	9	118.56744	9	149.04750	9	179.52756	9	210.00763	9	240.48768	9	270.96774	9	301.44780
90	27.43205	190	57.91212	290	88.39218	390	118.87224	490	149.35230	590	179.83236	690	210.31243	790	240.79248	890	271.27254	990	301.75260
1	27.73686	1	58.21692	1	88.69698	1	119.17704	1	149.65710	1	180.13716	1	210.61723	1	241.09728	1	271.57734	1	302.05740
2	28.04166	2	58.52172	2	89.00178	2	119.48184	2	149.96190	2	180.44196	2	210.92203	2	241.40208	2	271.88214	2	302.36220
3	28.34646	3	58.82652	3	89.30658	3	119.78664	3	150.26670	3	180.74676	3	211.22683	3	241.70688	3	272.18694	3	302.66701
4	28.65126	4	59.13132	4	89.61138	4	120.09144	4	150.57150	4	181.05156	4	211.53163	4	242.01168	4	272.49174	4	302.97181
5	28.95606	5	59.43612	5	89.91618	5	120.39624	5	150.87630	5	181.35636	5	211.83643	5	242.31648	5	272.79655	5	303.27661
6	29.26086	6	59.74092	6	90.22098	6	120.70104	6	151.18110	6	181.66116	6	212.14123	6	242.62129	6	273.10135	6	303.58141
7	29.56566	7	60.04573	7	90.52578	7	121.00584	7	151.48590	7	181.96596	7	212.44602	7	242.92609	7	273.40615	7	303.88621
8	29.87046	8	60.35053	8	90.83058	8	121.31064	8	151.79070	8	182.27076	8	212.75083	8	243.23089	8	273.71095	8	304.19101
9	30.17526	9	60.65533	9	91.13538	9	121.61544	9	152.09550	9	182.57557	9	213.05563	9	243.53569	9	274.01575	9	304.49581

1 inch = .02540 meter.	4 inches = .10160 meter.	7 inches = .17780 meter.	10 inches = .25400 meter.
2 inches = .05080 meter.	5 inches = .12700 meter.	8 inches = .20320 meter.	11 inches = .27940 meter.
3 inches = .07620 meter.	6 inches = .15240 meter.	9 inches = .22860 meter.	12 inches = .30480 meter.

50	164.04167	150	492.12500																
1	167.32250	1	495.40583																
2	170.60333	2	498.68667																
3	173.88417	3	501.96750	3	830.05000														
4	177.16500	4	505.24833	4	833.33167														
5	180.44583	5	508.52917	5	836.61250	5	1,164.69583												
6	183.72667	6	511.81000	6	839.89333	6	1,167.97667												
7	187.00750	7	515.09083	7	843.17417	7	1,171.25750	7	1,4										
8	190.28833	8	518.37167	8	846.45500	8	1,174.53833	8	1,502.62167										
9	193.56917	9	521.65250	9	849.73583	9	1,177.81917	9	1,505.90250										
60	196.85000	160	524.93333	260	853.01667	360	1,181.10000	460	1,509.18333	560	1,837.26667	660							
1	200.13083	1	528.21417	1	856.29750	1	1,184.38083	1	1,512.46417	1	1,840.54750	1	2,1						
2	203.41167	2	531.49500	2	859.57833	2	1,187.66167	2	1,515.74500	2	1,843.82833	2	2,171.91167						
3	206.69250	3	534.77583	3	862.85917	3	1,190.94250	3	1,519.02583	3	1,847.10917	3	2,175.19250						
4	209.97333	4	538.05667	4	866.14000	4	1,194.22333	4	1,522.30667	4	1,850.39000	4	2,178.47333	4	2,5				
5	213.25417	5	541.33750	5	869.42083	5	1,197.50417	5	1,525.58750	5	1,853.67083	5	2,181.75417	5	2,509.63750	5			
6	216.53500	6	544.61833	6	872.70167	6	1,200.78500	6	1,528.86833	6	1,856.95167	6	2,185.03500	6	2,513.11833	6	2,8		
7	219.81583	7	547.89917	7	875.98250	7	1,204.06583	7	1,532.14917	7	1,860.23250	7	2,188.31583	7	2,516.39917	7	2,841.48250		
8	223.09667	8	551.18000	8	879.26333	8	1,207.34667	8	1,535.43000	8	1,863.51333	8	2,191.59667	8	2,519.68000	8	2,847.76333	8	3,1
9	226.37750	9	554.46083	9	882.54417	9	1,210.62750	9	1,538.71083	9	1,866.79417	9	2,194.87750	9	2,522.96083	9	2,851.04417	9	3,179.12750
70	229.65833	170	557.74167	270	885.82500	370	1,213.90833	470	1,541.99167	570	1,870.07500	670	2,198.15833	770	2,526.24167	870	2,854.32500	970	3,182.40833
1	232.93917	1	561.02250	1	889.10583	1	1,217.18917	1	1,545.27250	1	1,873.35583	1	2,201.43917	1	2,529.52250	1	2,857.60583	1	3,185.68917
2	236.22000	2	564.30333	2	892.38667	2	1,220.47000	2	1,548.55333	2	1,876.63667	2	2,204.72000	2	2,532.80333	2	2,860.88667	2	3,188.97000
3	239.50083	3	567.58417	3	895.66750	3	1,223.75083	3	1,551.83417	3	1,879.91750	3	2,208.00083	3	2,536.08417	3	2,864.16750	3	3,192.25083
4	242.78167	4	570.86500	4	898.94833	4	1,227.03167	4	1,555.11500	4	1,883.19833	4	2,211.28167	4	2,539.36500	4	2,867.44833	4	3,195.53167
5	246.06250	5	574.14583	5	902.22917	5	1,230.31250	5	1,558.39583	5	1,886.47917	5	2,214.56250	5	2,542.64583	5	2,870.72917	5	3,198.81250
6	249.34333	6	577.42667	6	905.51000	6	1,233.59333	6	1,561.67667	6	1,889.76000	6	2,217.84333	6	2,545.92667	6	2,874.01000	6	3,202.09333
7	252.62417	7	580.70750	7	908.79083	7	1,236.87417	7	1,564.95750	7	1,893.04083	7	2,221.12417	7	2,549.20750	7	2,877.29083	7	3,205.37417
8	255.90500	8	583.98833	8	912.07167	8	1,240.15500	8	1,568.23833	8	1,896.32167	8	2,224.40500	8	2,552.48833	8	2,880.57167	8	3,208.65500
9	259.18583	9	587.26917	9	915.35250	9	1,243.43583	9	1,571.51917	9	1,899.60250	9	2,227.68583	9	2,555.76917	9	2,883.85250	9	3,211.93583
80	262.46667	180	590.55000	280	918.63333	380	1,246.71667	480	1,574.80000	580	1,902.88333	680	2,230.96667	780	2,559.05000	880	2,887.13333	980	3,215.21667
1	265.74750	1	593.83083	1	921.91417	1	1,249.99750	1	1,578.08083	1	1,906.10417	1	2,234.24750	1	2,562.33083	1	2,890.41417	1	3,218.49750
2	269.02833	2	597.11167	2	925.19500	2	1,253.27833	2	1,581.36167	2	1,909.44500	2	2,237.52833	2	2,565.61167	2	2,893.69500	2	3,221.77833
3	272.30917	3	600.39250	3	928.47583	3	1,256.55917	3	1,584.64250	3	1,912.72583	3	2,240.80917	3	2,568.89250	3	2,896.97583	3	3,225.05917
4	275.59000	4	603.67333	4	931.75667	4	1,259.84000	4	1,587.92333	4	1,916.00667	4	2,244.09000	4	2,572.17333	4	2,900.25667	4	3,228.34000
5	278.87083	5	606.95417	5	935.03750	5	1,263.12083	5	1,591.20417	5	1,919.28750	5	2,247.37083	5	2,575.45417	5	2,903.53750	5	3,231.62083
6	282.15167	6	610.23500	6	938.31833	6	1,266.40167	6	1,594.48500	6	1,922.56833	6	2,250.65167	6	2,578.73500	6	2,906.81833	6	3,234.90167
7	285.43250	7	613.51583	7	941.59917	7	1,269.68250	7	1,597.76583	7	1,925.84917	7	2,253.93250	7	2,582.01583	7	2,910.09917	7	3,238.18250
8	288.71333	8	616.79667	8	944.88000	8	1,272.96333	8	1,601.04667	8	1,929.13000	8	2,257.21333	8	2,585.29667	8	2,913.38000	8	3,241.46333
9	291.99417	9	620.07750	9	948.16083	9	1,276.24417	9	1,604.32750	9	1,932.41083	9	2,260.49417	9	2,588.57750	9	2,916.66083	9	3,244.74417
90	295.27500	190	623.35833	290	951.44167	390	1,279.52500	490	1,607.60833	590	1,935.69167	690	2,263.77500	790	2,591.85833	890	2,919.94167	990	3,248.02500
1	298.55583	1	626.63917	1	954.72250	1	1,282.80583	1	1,610.88917	1	1,938.97250	1	2,267.05583	1	2,595.13917	1	2,923.22250	1	3,251.30583
2	301.83667	2	629.92000	2	958.00333	2	1,286.08667	2	1,614.17000	2	1,942.25333	2	2,270.33667	2	2,598.42000	2	2,926.50333	2	3,254.58667
3	305.11750	3	633.20083	3	961.28417	3	1,289.36750	3	1,617.45083	3	1,945.53417	3	2,273.61750	3	2,601.70083	3	2,929.78417	3	3,257.86750
4	308.39833	4	636.48167	4	964.56500	4	1,292.64833	4	1,620.73167	4	1,948.81500	4	2,276.89833	4	2,604.98167	4	2,933.06500	4	3,261.14833
5	311.67917	5	639.76250	5	967.84583	5	1,295.92917	5	1,624.01250	5	1,952.09583	5	2,280.17917	5	2,608.26250	5	2,936.34583	5	3,264.42917
6	314.96000	6	643.04333	6	971.12667	6	1,299.21000	6	1,627.29333	6	1,955.37667	6	2,283.46000	6	2,611.54333	6	2,939.62667	6	3,267.71000
7	318.24083	7	646.32417	7	974.40750	7	1,302.49083	7	1,630.57417	7	1,958.65750	7	2,286.74083	7	2,614.82417	7	2,942.90750	7	3,270.99083
8	321.52167	8	649.60500	8	977.68833	8	1,305.77167	8	1,633.85500	8	1,961.93833	8	2,290.02167	8	2,618.10500	8	2,946.18833	8	3,274.27167
9	324.80250	9	652.88583	9	980.96917	9	1,309.05250	9	1,637.13583	9	1,965.21917	9	2,293.30250	9	2,621.38583	9	2,949.46917	9	3,277.55250

Lengths—Meters to feet (from 1 to 1,000 units).

[Reduction factor: 1 meter = 3.280833333 feet.]

Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.
0		**100**	328.08333	**200**	656.16667	**300**	984.25000	**400**	1,312.33333	**500**	1,640.41667	**600**	1,968.50000	**700**	2,296.58333	**800**	2,624.66667	**900**	2,952.75000
1	3.28083	1	331.36417	1	659.44750	1	987.53083	1	1,315.61417	1	1,643.69750	1	1,971.78083	1	2,299.86417	1	2,627.94750	1	2,956.03083
2	6.56167	2	334.64500	2	662.72833	2	990.81167	2	1,318.89500	2	1,646.97833	2	1,975.06167	2	2,303.14500	2	2,631.22833	2	2,959.31167
3	9.84250	3	337.92583	3	666.00917	3	994.09250	3	1,322.17583	3	1,650.25917	3	1,978.34250	3	2,306.42583	3	2,634.50917	3	2,962.59250
4	13.12333	4	341.20667	4	669.29000	4	997.37333	4	1,325.45667	4	1,653.54000	4	1,981.62333	4	2,309.70667	4	2,637.79000	4	2,965.87333
5	16.40417	5	344.48750	5	672.57083	5	1,000.65417	5	1,328.73750	5	1,656.82083	5	1,984.90417	5	2,312.98750	5	2,641.07083	5	2,969.15417
6	19.68500	6	347.76833	6	675.85167	6	1,003.93500	6	1,332.01833	6	1,660.10167	6	1,988.18500	6	2,316.26833	6	2,644.35167	6	2,972.43500
7	22.96583	7	351.04917	7	679.13250	7	1,007.21583	7	1,335.29917	7	1,663.38250	7	1,991.46583	7	2,319.54917	7	2,647.63250	7	2,975.71583
8	26.24667	8	354.33000	8	682.41333	8	1,010.49667	8	1,338.58000	8	1,666.66333	8	1,994.74667	8	2,322.83000	8	2,650.91333	8	2,978.99667
9	29.52750	9	357.61083	9	685.69417	9	1,013.77750	9	1,341.86083	9	1,669.94417	9	1,998.02750	9	2,326.11083	9	2,654.19417	9	2,982.27750
10	32.80833	**110**	360.89167	**210**	688.97500	**310**	1,017.05833	**410**	1,345.14167	**510**	1,673.22500	**610**	2,001.30833	**710**	2,329.39167	**810**	2,657.47500	**910**	2,985.55833
1	36.08917	1	364.17250	1	692.25583	1	1,020.33917	1	1,348.42250	1	1,676.50583	1	2,004.58917	1	2,332.67250	1	2,660.75583	1	2,988.83917
2	39.37000	2	367.45333	2	695.53667	2	1,023.62000	2	1,351.70333	2	1,679.78667	2	2,007.87000	2	2,335.95333	2	2,664.03667	2	2,992.12000
3	42.65083	3	370.73417	3	698.81750	3	1,026.90083	3	1,354.98417	3	1,683.06750	3	2,011.15083	3	2,339.23417	3	2,667.31750	3	2,995.40083
4	45.93167	4	374.01500	4	702.09833	4	1,030.18167	4	1,358.26500	4	1,686.34833	4	2,014.43167	4	2,342.51500	4	2,670.59833	4	2,998.68167
5	49.21250	5	377.29583	5	705.37917	5	1,033.46250	5	1,361.54583	5	1,689.62917	5	2,017.71250	5	2,345.79583	5	2,673.87917	5	3,001.96250
6	52.49333	6	380.57667	6	708.66000	6	1,036.74333	6	1,364.82667	6	1,692.91000	6	2,020.99333	6	2,349.07667	6	2,677.16000	6	3,005.24333
7	55.77417	7	383.85750	7	711.94083	7	1,040.02417	7	1,368.10750	7	1,696.19083	7	2,024.27417	7	2,352.35750	7	2,680.44083	7	3,008.52417
8	59.05500	8	387.13833	8	715.22167	8	1,043.30500	8	1,371.38833	8	1,699.47167	8	2,027.55500	8	2,355.63833	8	2,683.72167	8	3,011.80500
9	62.33583	9	390.41917	9	718.50250	9	1,046.58583	9	1,374.66917	9	1,702.75250	9	2,030.83583	9	2,358.91917	9	2,687.00250	9	3,015.08583
20	65.61667	**120**	393.70000	**220**	721.78333	**320**	1,049.86667	**420**	1,377.95000	**520**	1,706.03333	**620**	2,034.11667	**720**	2,362.20000	**820**	2,690.28333	**920**	3,018.36667
1	68.89750	1	396.98083	1	725.06417	1	1,053.14750	1	1,381.23083	1	1,709.31417	1	2,037.39750	1	2,365.48083	1	2,693.56417	1	3,021.64750
2	72.17833	2	400.26167	2	728.34500	2	1,056.42833	2	1,384.51167	2	1,712.59500	2	2,040.67833	2	2,368.76167	2	2,696.84500	2	3,024.92833
3	75.45917	3	403.54250	3	731.62583	3	1,059.70917	3	1,387.79250	3	1,715.87583	3	2,043.95917	3	2,372.04250	3	2,700.12583	3	3,028.20917
4	78.74000	4	406.82333	4	734.90667	4	1,062.99000	4	1,391.07333	4	1,719.15667	4	2,047.24000	4	2,375.32333	4	2,703.40667	4	3,031.49000
5	82.02083	5	410.10417	5	738.18750	5	1,066.27083	5	1,394.35417	5	1,722.43750	5	2,050.52083	5	2,378.60417	5	2,706.68750	5	3,034.77083
6	85.30167	6	413.38500	6	741.46833	6	1,069.55167	6	1,397.63500	6	1,725.71833	6	2,053.80167	6	2,381.88500	6	2,709.96833	6	3,038.05167
7	88.58250	7	416.66583	7	744.74917	7	1,072.83250	7	1,400.91583	7	1,728.99917	7	2,057.08250	7	2,385.16583	7	2,713.24917	7	3,041.33250
8	91.86333	8	419.94667	8	748.03000	8	1,076.11333	8	1,404.19667	8	1,732.28000	8	2,060.36333	8	2,388.44667	8	2,716.53000	8	3,044.61333
9	95.14417	9	423.22750	9	751.31083	9	1,079.39417	9	1,407.47750	9	1,735.56083	9	2,063.64417	9	2,391.72750	9	2,719.81083	9	3,047.89417
30	98.42500	**130**	426.50833	**230**	754.59167	**330**	1,082.67500	**430**	1,410.75833	**530**	1,738.84167	**630**	2,066.92500	**730**	2,395.00833	**830**	2,723.09167	**930**	3,051.17500
1	101.70583	1	429.78917	1	757.87250	1	1,085.95583	1	1,414.03917	1	1,742.12250	1	2,070.20583	1	2,398.28917	1	2,726.37250	1	3,054.45583
2	104.98667	2	433.07000	2	761.15333	2	1,089.23667	2	1,417.32000	2	1,745.40333	2	2,073.48667	2	2,401.57000	2	2,729.65333	2	3,057.73667
3	108.26750	3	436.35083	3	764.43417	3	1,092.51750	3	1,420.60083	3	1,748.68417	3	2,076.76750	3	2,404.85083	3	2,732.93417	3	3,061.01750
4	111.54833	4	439.63167	4	767.71500	4	1,095.79833	4	1,423.88167	4	1,751.96500	4	2,080.04833	4	2,408.13167	4	2,736.21500	4	3,064.29833
5	114.82917	5	442.91250	5	770.99583	5	1,099.07917	5	1,427.16250	5	1,755.24583	5	2,083.32917	5	2,411.41250	5	2,739.49583	5	3,067.57917
6	118.11000	6	446.19333	6	774.27667	6	1,102.36000	6	1,430.44333	6	1,758.52667	6	2,086.61000	6	2,414.69333	6	2,742.77667	6	3,070.86000
7	121.39083	7	449.47417	7	777.55750	7	1,105.64083	7	1,433.72417	7	1,761.80750	7	2,089.89083	7	2,417.97417	7	2,746.05750	7	3,074.14083
8	124.67167	8	452.75500	8	780.83833	8	1,108.92167	8	1,437.00500	8	1,765.08833	8	2,093.17167	8	2,421.25500	8	2,749.33833	8	3,077.42167
9	127.95250	9	456.03583	9	784.11917	9	1,112.20250	9	1,440.28583	9	1,768.36917	9	2,096.45250	9	2,424.53583	9	2,752.61917	9	3,080.70250
40	131.23333	**140**	459.31667	**240**	787.40000	**340**	1,115.48333	**440**	1,443.56667	**540**	1,771.65000	**640**	2,099.73333	**740**	2,427.81667	**840**	2,755.90000	**940**	3,083.98333
1	134.51417	1	462.59750	1	790.68083	1	1,118.76417	1	1,446.84750	1	1,774.93083	1	2,103.01417	1	2,431.09750	1	2,759.18083	1	3,087.26417
2	137.79500	2	465.87833	2	793.96167	2	1,122.04500	2	1,450.12833	2	1,778.21167	2	2,106.29500	2	2,434.37833	2	2,762.46167	2	3,090.54500
3	141.07583	3	469.15917	3	797.24250	3	1,125.32583	3	1,453.40917	3	1,781.49250	3	2,109.57583	3	2,437.65917	3	2,765.74250	3	3,093.82583
4	144.35667	4	472.44000	4	800.52333	4	1,128.60667	4	1,456.69000	4	1,784.77333	4	2,112.85667	4	2,440.94000	4	2,769.02333	4	3,097.10667
5	147.63750	5	475.72083	5	803.80417	5	1,131.88750	5	1,459.97083	5	1,788.05417	5	2,116.13750	5	2,444.22083	5	2,772.30417	5	3,100.38750
6	150.91833	6	479.00167	6	807.08500	6	1,135.16833	6	1,463.25167	6	1,791.33500	6	2,119.41833	6	2,447.50167	6	2,775.58500	6	3,103.66833
7	154.19917	7	482.28250	7	810.36583	7	1,138.44917	7	1,466.53250	7	1,794.61583	7	2,122.69917	7	2,450.78250	7	2,778.86583	7	3,106.94917
8	157.48000	8	485.56333	8	813.64667	8	1,141.73000	8	1,469.81333	8	1,797.89667	8	2,125.98000	8	2,454.06333	8	2,782.14667	8	3,110.23000
9	160.76083	9	488.84417	9	816.92750	9	1,145.01083	9	1,473.09417	9	1,801.17750	9	2,129.26083	9	2,457.34417	9	2,785.42750	9	3,113.51083

50	164.04167	**150**	492.12500	**250**	820.20833	**350**	1,148.29167	**450**	1,476.37500	**550**	1,804.45833	**650**	2,132.54167	**750**	2,460.62500	**850**	2,788.70833	**950**	3,116.79167
1	167.32250	1	495.40583	1	823.48917	1	1,151.57250	1	1,479.65583	1	1,807.73917	1	2,135.82250	1	2,463.90583	1	2,791.98917	1	3,120.07250
2	170.60333	2	498.68667	2	826.77000	2	1,154.85333	2	1,482.93667	2	1,811.02000	2	2,139.10333	2	2,467.18667	2	2,795.27000	2	3,123.35333
3	173.88417	3	501.96750	3	830.05083	3	1,158.13417	3	1,486.21750	3	1,814.30083	3	2,142.38417	3	2,470.46750	3	2,798.55083	3	3,126.63417
4	177.16500	4	505.24833	4	833.33167	4	1,161.41500	4	1,489.49833	4	1,817.58167	4	2,145.66500	4	2,473.74833	4	2,801.83167	4	3,129.91500
5	180.44583	5	508.52917	5	836.61250	5	1,164.69583	5	1,492.77917	5	1,820.86250	5	2,148.94583	5	2,477.02917	5	2,805.11250	5	3,133.19583
6	183.72667	6	511.81000	6	839.89333	6	1,167.97667	6	1,496.06000	6	1,824.14333	6	2,152.22667	6	2,480.31000	6	2,808.39333	6	3,136.47667
7	187.00750	7	515.09083	7	843.17417	7	1,171.25750	7	1,499.34083	7	1,827.42417	7	2,155.50750	7	2,483.59083	7	2,811.67417	7	3,139.75750
8	190.28833	8	518.37167	8	846.45500	8	1,174.53833	8	1,502.62167	8	1,830.70500	8	2,158.78833	8	2,486.87167	8	2,814.95500	8	3,143.03833
9	193.56917	9	521.65250	9	849.73583	9	1,177.81917	9	1,505.90250	9	1,833.98583	9	2,162.06917	9	2,490.15250	9	2,818.23583	9	3,146.31917
60	196.85000	**160**	524.93333	**260**	853.01667	**360**	1,181.10000	**460**	1,509.18333	**560**	1,837.26667	**660**	2,165.35000	**760**	2,493.43333	**860**	2,821.51667	**960**	3,149.60000
1	200.13083	1	528.21417	1	856.29750	1	1,184.38083	1	1,512.46417	1	1,840.54750	1	2,168.63083	1	2,496.71417	1	2,824.79750	1	3,152.88083
2	203.41167	2	531.49500	2	859.57833	2	1,187.66167	2	1,515.74500	2	1,843.82833	2	2,171.91167	2	2,499.99500	2	2,828.07833	2	3,156.16167
3	206.69250	3	534.77583	3	862.85917	3	1,190.94250	3	1,519.02583	3	1,847.10917	3	2,175.19250	3	2,503.27583	3	2,831.35917	3	3,159.44250
4	209.97333	4	538.05667	4	866.14000	4	1,194.22333	4	1,522.30667	4	1,850.39000	4	2,178.47333	4	2,506.55667	4	2,834.64000	4	3,162.72333
5	213.25417	5	541.33750	5	869.42083	5	1,197.50417	5	1,525.58750	5	1,853.67083	5	2,181.75417	5	2,509.83750	5	2,837.92083	5	3,166.00417
6	216.53500	6	544.61833	6	872.70167	6	1,200.78500	6	1,528.86833	6	1,856.96167	6	2,185.03500	6	2,513.11833	6	2,841.20167	6	3,169.28500
7	219.81583	7	547.89917	7	875.98250	7	1,204.06583	7	1,532.14917	7	1,860.23250	7	2,188.31583	7	2,516.39917	7	2,844.48250	7	3,172.56583
8	223.09667	8	551.18000	8	879.26333	8	1,207.34667	8	1,535.43000	8	1,863.51333	8	2,191.59667	8	2,519.68000	8	2,847.76333	8	3,175.84667
9	226.37750	9	554.46083	9	882.54417	9	1,210.62750	9	1,538.71083	9	1,866.79417	9	2,194.87750	9	2,522.96083	9	2,851.04417	9	3,179.12750
70	229.65833	**170**	557.74167	**270**	885.82500	**370**	1,213.90833	**470**	1,541.99167	**570**	1,870.07500	**670**	2,198.15833	**770**	2,526.24167	**870**	2,854.32500	**970**	3,182.40833
1	232.93917	1	561.02250	1	889.10583	1	1,217.18917	1	1,545.27250	1	1,873.35583	1	2,201.43917	1	2,529.52250	1	2,857.60583	1	3,185.68917
2	236.22000	2	564.30333	2	892.38667	2	1,220.47000	2	1,548.55333	2	1,876.63667	2	2,204.72000	2	2,532.80333	2	2,860.88667	2	3,188.97000
3	239.50083	3	567.58417	3	895.66750	3	1,223.75083	3	1,551.83417	3	1,879.91750	3	2,208.00083	3	2,536.08417	3	2,864.16750	3	3,192.25083
4	242.78167	4	570.86500	4	898.94833	4	1,227.03167	4	1,555.11500	4	1,883.19833	4	2,211.28167	4	2,539.36500	4	2,867.44833	4	3,195.53167
5	246.06250	5	574.14583	5	902.22917	5	1,230.31250	5	1,558.39583	5	1,886.47917	5	2,214.56250	5	2,542.64583	5	2,870.72917	5	3,198.81250
6	249.34333	6	577.42667	6	905.51000	6	1,233.59333	6	1,561.67667	6	1,889.76000	6	2,217.84333	6	2,545.92667	6	2,874.01000	6	3,202.09333
7	252.62417	7	580.70750	7	908.79083	7	1,236.87417	7	1,564.95750	7	1,893.04083	7	2,221.12417	7	2,549.20750	7	2,877.29083	7	3,205.37417
8	255.90500	8	583.98833	8	912.07167	8	1,240.15500	8	1,568.23833	8	1,896.32167	8	2,224.40500	8	2,552.48833	8	2,880.57167	8	3,208.65500
9	259.18583	9	587.26917	9	915.35250	9	1,243.43583	9	1,571.51917	9	1,899.60250	9	2,227.68583	9	2,555.76917	9	2,883.85250	9	3,211.93583
80	262.46667	**180**	590.55000	**280**	918.63333	**380**	1,246.71667	**480**	1,574.80000	**580**	1,902.88333	**680**	2,230.96667	**780**	2,559.05000	**880**	2,887.13333	**980**	3,215.21667
1	265.74750	1	593.83083	1	921.91417	1	1,249.99750	1	1,578.08083	1	1,906.16417	1	2,234.24750	1	2,562.33083	1	2,890.41417	1	3,218.49750
2	269.02833	2	597.11167	2	925.19500	2	1,253.27833	2	1,581.36167	2	1,909.44500	2	2,237.52833	2	2,565.61167	2	2,893.69500	2	3,221.77833
3	272.30917	3	600.39250	3	928.47583	3	1,256.55917	3	1,584.64250	3	1,912.72583	3	2,240.80917	3	2,568.89250	3	2,896.97583	3	3,225.05917
4	275.59000	4	603.67333	4	931.75667	4	1,259.84000	4	1,587.92333	4	1,916.00667	4	2,244.09000	4	2,572.17333	4	2,900.25667	4	3,228.34000
5	278.87083	5	606.95417	5	935.03750	5	1,263.12083	5	1,591.20417	5	1,919.28750	5	2,247.37083	5	2,575.45417	5	2,903.53750	5	3,231.62083
6	282.15167	6	610.23500	6	938.31833	6	1,266.40167	6	1,594.48500	6	1,922.56833	6	2,250.65167	6	2,578.73500	6	2,906.81833	6	3,234.90167
7	285.43250	7	613.51583	7	941.59917	7	1,269.68250	7	1,597.76583	7	1,925.84917	7	2,253.93250	7	2,582.01583	7	2,910.09917	7	3,238.18250
8	288.71333	8	616.79667	8	944.88000	8	1,272.96333	8	1,601.04667	8	1,929.13000	8	2,257.21333	8	2,585.29667	8	2,913.38000	8	3,241.46333
9	291.99417	9	620.07750	9	948.16083	9	1,276.24417	9	1,604.32750	9	1,932.41083	9	2,260.49417	9	2,588.57750	9	2,916.66083	9	3,244.74417
90	295.27500	**190**	623.35833	**290**	951.44167	**390**	1,279.52500	**490**	1,607.60833	**590**	1,935.69167	**690**	2,263.77500	**790**	2,591.85833	**890**	2,919.94167	**990**	3,248.02500
1	298.55583	1	626.63917	1	954.72250	1	1,282.80583	1	1,610.88917	1	1,938.97250	1	2,267.05583	1	2,595.13917	1	2,923.22250	1	3,251.30583
2	301.83667	2	629.92000	2	958.00333	2	1,286.08667	2	1,614.17000	2	1,942.25333	2	2,270.33667	2	2,598.42000	2	2,926.50333	2	3,254.58667
3	305.11750	3	633.20083	3	961.28417	3	1,289.36750	3	1,617.45083	3	1,945.53417	3	2,273.61750	3	2,601.70083	3	2,929.78417	3	3,257.86750
4	308.39833	4	636.48167	4	964.56500	4	1,292.64833	4	1,620.73167	4	1,948.81500	4	2,276.89833	4	2,604.98167	4	2,933.06500	4	3,261.14833
5	311.67917	5	639.76250	5	967.84583	5	1,295.92917	5	1,624.01250	5	1,952.09583	5	2,280.17917	5	2,608.26250	5	2,936.34583	5	3,264.42917
6	314.96000	6	643.04333	6	971.12667	6	1,299.21000	6	1,627.29333	6	1,955.37667	6	2,283.46000	6	2,611.54333	6	2,939.62667	6	3,267.71000
7	318.24083	7	646.32417	7	974.40750	7	1,302.49083	7	1,630.57417	7	1,958.65750	7	2,286.74083	7	2,614.82417	7	2,942.90750	7	3,270.99083
8	321.52167	8	649.60500	8	977.68833	8	1,305.77167	8	1,633.85500	8	1,961.93833	8	2,290.02167	8	2,618.10500	8	2,946.18833	8	3,274.27167
9	324.80250	9	652.88583	9	980.96917	9	1,309.05250	9	1,637.13583	9	1,965.21917	9	2,293.30250	9	2,621.38583	9	2,949.46917	9	3,277.55250

Lengths—Feet to meters (from 1 to 1,000 units).

[Reduction factor: 1 foot = 0.3048006096 meter.]

Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.
0		100	30.48006	200	60.96012	300	91.44018	400	121.92024	500	152.40030	600	182.88037	700	213.36043	800	243.84049	900	274.32055
1	.30480	1	30.78486	1	61.26492	1	91.74498	1	122.22504	1	152.70511	1	183.18517	1	213.66523	1	244.14529	1	274.62535
2	.60960	2	31.08966	2	61.56972	2	92.04978	2	122.52985	2	153.00991	2	183.48997	2	213.97003	2	244.45009	2	274.93015
3	.91440	3	31.39446	3	61.87452	3	92.35458	3	122.83465	3	153.31471	3	183.79477	3	214.27483	3	244.75489	3	275.23495
4	1.21920	4	31.69926	4	62.17932	4	92.65939	4	123.13945	4	153.61951	4	184.09957	4	214.57963	4	245.05969	4	275.53975
5	1.52400	5	32.00406	5	62.48412	5	92.96419	5	123.44425	5	153.92431	5	184.40437	5	214.88443	5	245.36449	5	275.84455
6	1.82880	6	32.30886	6	62.78892	6	93.26899	6	123.74905	6	154.22911	6	184.70917	6	215.18923	6	245.66929	6	276.14936
7	2.13360	7	32.61367	7	63.09373	7	93.57379	7	124.05385	7	154.53391	7	185.01397	7	215.49403	7	245.97409	7	276.45415
8	2.43840	8	32.91847	8	63.39853	8	93.87859	8	124.35865	8	154.83871	8	185.31877	8	215.79883	8	246.27889	8	276.75895
9	2.74321	9	33.22327	9	63.70333	9	94.18339	9	124.66345	9	155.14351	9	185.62357	9	216.10363	9	246.58369	9	277.06375
10	3.04801	110	33.52807	210	64.00813	310	94.48819	410	124.96825	510	155.44831	610	185.92837	710	216.40843	810	246.88849	910	277.36855
1	3.35281	1	33.83287	1	64.31293	1	94.79299	1	125.27305	1	155.75311	1	186.23317	1	216.71323	1	247.19329	1	277.67336
2	3.65761	2	34.13767	2	64.61773	2	95.09779	2	125.57785	2	156.05791	2	186.53797	2	217.01803	2	247.49810	2	277.97816
3	3.96241	3	34.44247	3	64.92253	3	95.40259	3	125.88265	3	156.36271	3	186.84277	3	217.32283	3	247.80290	3	278.28296
4	4.26721	4	34.74727	4	65.22733	4	95.70739	4	126.18745	4	156.66751	4	187.14757	4	217.62764	4	248.10770	4	278.58776
5	4.57201	5	35.05207	5	65.53213	5	96.01219	5	126.49225	5	156.97231	5	187.45237	5	217.93244	5	248.41250	5	278.89256
6	4.87681	6	35.35687	6	65.83693	6	96.31699	6	126.79705	6	157.27711	6	187.75718	6	218.23724	6	248.71730	6	279.19736
7	5.18161	7	35.66167	7	66.14173	7	96.62179	7	127.10185	7	157.58192	7	188.06198	7	218.54204	7	249.02210	7	279.50216
8	5.48641	8	35.96647	8	66.44653	8	96.92659	8	127.40665	8	157.88672	8	188.36678	8	218.84684	8	249.32690	8	279.80696
9	5.79121	9	36.27127	9	66.75133	9	97.23139	9	127.71146	9	158.19152	9	188.67158	9	219.15164	9	249.63170	9	280.11176
20	6.09601	120	36.57607	220	67.05613	320	97.53620	420	128.01626	520	158.49632	620	188.97638	720	219.45644	820	249.93650	920	280.41656
1	6.40081	1	36.88087	1	67.36093	1	97.84100	1	128.32106	1	158.80112	1	189.28118	1	219.76124	1	250.24130	1	280.72136
2	6.70561	2	37.18567	2	67.66574	2	98.14580	2	128.62586	2	159.10592	2	189.58598	2	220.06604	2	250.54610	2	281.02616
3	7.01041	3	37.49047	3	67.97054	3	98.45060	3	128.93066	3	159.41072	3	189.89078	3	220.37084	3	250.85090	3	281.33096
4	7.31521	4	37.79528	4	68.27534	4	98.75540	4	129.23546	4	159.71552	4	190.19558	4	220.67564	4	251.15570	4	281.63576
5	7.62002	5	38.10008	5	68.58014	5	99.06020	5	129.54026	5	160.02032	5	190.50038	5	220.98044	5	251.46050	5	281.94056
6	7.92482	6	38.40488	6	68.88494	6	99.36500	6	129.84506	6	160.32512	6	190.80518	6	221.28524	6	251.76530	6	282.24536
7	8.22962	7	38.70968	7	69.18974	7	99.66980	7	130.14986	7	160.62992	7	191.10998	7	221.59004	7	252.07010	7	282.55017
8	8.53442	8	39.01448	8	69.49454	8	99.97460	8	130.45466	8	160.93472	8	191.41478	8	221.89484	8	252.37490	8	282.85497
9	8.83922	9	39.31928	9	69.79934	9	100.27940	9	130.75946	9	161.23952	9	191.71958	9	222.19964	9	252.67971	9	283.15977
30	9.14402	130	39.62408	230	70.10414	330	100.58420	430	131.06426	530	161.54432	630	192.02438	730	222.50445	830	252.98451	930	283.46457
1	9.44882	1	39.92888	1	70.40894	1	100.88900	1	131.36906	1	161.84912	1	192.32918	1	222.80925	1	253.28931	1	283.76937
2	9.75362	2	40.23368	2	70.71374	2	101.19380	2	131.67386	2	162.15392	2	192.63399	2	223.11405	2	253.59411	2	284.07417
3	10.05842	3	40.53848	3	71.01854	3	101.49860	3	131.97866	3	162.45872	3	192.93879	3	223.41885	3	253.89891	3	284.37897
4	10.36322	4	40.84328	4	71.32334	4	101.80340	4	132.28346	4	162.76353	4	193.24359	4	223.72365	4	254.20371	4	284.68377
5	10.66802	5	41.14808	5	71.62814	5	102.10820	5	132.58827	5	163.06833	5	193.54839	5	224.02845	5	254.50851	5	284.98857
6	10.97282	6	41.45288	6	71.93294	6	102.41300	6	132.89307	6	163.37313	6	193.85319	6	224.33325	6	254.81331	6	285.29337
7	11.27762	7	41.75768	7	72.23774	7	102.71781	7	133.19787	7	163.67793	7	194.15799	7	224.63805	7	255.11811	7	285.59817
8	11.58242	8	42.06248	8	72.54255	8	103.02261	8	133.50267	8	163.98273	8	194.46279	8	224.94285	8	255.42291	8	285.90297
9	11.88722	9	42.36728	9	72.84735	9	103.32741	9	133.80747	9	164.28753	9	194.76759	9	225.24765	9	255.72771	9	286.20777
40	12.19202	140	42.67209	240	73.15215	340	103.63221	440	134.11227	540	164.59233	640	195.07239	740	225.55245	840	256.03251	940	286.51257
1	12.49682	1	42.97689	1	73.45695	1	103.93701	1	134.41707	1	164.89713	1	195.37719	1	225.85725	1	256.33731	1	286.81737
2	12.80163	2	43.28169	2	73.76175	2	104.24181	2	134.72187	2	165.20193	2	195.68199	2	226.16205	2	256.64211	2	287.12217
3	13.10643	3	43.58649	3	74.06655	3	104.54661	3	135.02667	3	165.50673	3	195.98679	3	226.46685	3	256.94691	3	287.42697
4	13.41123	4	43.89129	4	74.37135	4	104.85141	4	135.33147	4	165.81153	4	196.29159	4	226.77165	4	257.25171	4	287.73178
5	13.71603	5	44.19609	5	74.67615	5	105.15621	5	135.63627	5	166.11633	5	196.59639	5	227.07645	5	257.55652	5	288.03658
6	14.02083	6	44.50089	6	74.98096	6	105.46101	6	135.94107	6	166.42113	6	196.90119	6	227.38125	6	257.86132	6	288.34138
7	14.32563	7	44.80569	7	75.28575	7	105.76581	7	136.24587	7	166.72593	7	197.20599	7	227.68606	7	258.16612	7	288.64618
8	14.63043	8	45.11049	8	75.59055	8	106.07061	8	136.55067	8	167.03073	8	197.51080	8	227.99086	8	258.47092	8	288.95098
9	14.93523	9	45.41529	9	75.89535	9	106.37541	9	136.85547	9	167.33553	9	197.81560	9	228.29566	9	258.77572	9	289.25578

50	15.24003	150	45.72009	250	76.20015	350	106.68021	450	137.16027	550	167.64034	650	198.12040	750	228.60046	850	259.08052	950	289.56058
1	15.54483	1	46.02489	1	76.50495	1	106.98501	1	137.46507	1	167.94514	1	198.42520	1	228.90526	1	259.38532	1	289.86538
2	15.84963	2	46.32969	2	76.80975	2	107.28981	2	137.76988	2	168.24994	2	198.73000	2	229.21006	2	259.69012	2	290.17018
3	16.15443	3	46.63449	3	77.11455	3	107.59462	3	138.07468	3	168.55474	3	199.03480	3	229.51486	3	259.99492	3	290.47498
4	16.45923	4	46.93929	4	77.41935	4	107.89942	4	138.37948	4	168.85954	4	199.33960	4	229.81966	4	260.29972	4	290.77978
5	16.76403	5	47.24409	5	77.72416	5	108.20422	5	138.68428	5	169.16434	5	199.64440	5	230.12446	5	260.60452	5	291.08458
6	17.06883	6	47.54890	6	78.02896	6	108.50902	6	138.98908	6	169.46914	6	199.94920	6	230.42926	6	260.90932	6	291.38938
7	17.37363	7	47.85370	7	78.33376	7	108.81382	7	139.29388	7	169.77394	7	200.25400	7	230.73406	7	261.21412	7	291.69418
8	17.67844	8	48.15850	8	78.63856	8	109.11862	8	139.59868	8	170.07874	8	200.55880	8	231.03886	8	261.51892	8	291.99898
9	17.98324	9	48.46330	9	78.94336	9	109.42342	9	139.90348	9	170.38354	9	200.86360	9	231.34366	9	261.82372	9	292.30378
60	18.28804	160	48.76810	260	79.24816	360	109.72822	460	140.20828	560	170.68834	660	201.16840	760	231.64846	860	262.12852	960	292.60859
1	18.59284	1	49.07290	1	79.55296	1	110.03302	1	140.51308	1	170.99314	1	201.47320	1	231.95326	1	262.43332	1	292.91339
2	18.89764	2	49.37770	2	79.85776	2	110.33782	2	140.81788	2	171.29794	2	201.77800	2	232.25806	2	262.73813	2	293.21819
3	19.20244	3	49.68250	3	80.16256	3	110.64262	3	141.12268	3	171.60274	3	202.08280	3	232.56287	3	263.04293	3	293.52299
4	19.50724	4	49.98730	4	80.46736	4	110.94742	4	141.42748	4	171.90754	4	202.38760	4	232.86767	4	263.34773	4	293.82779
5	19.81204	5	50.29210	5	80.77216	5	111.25222	5	141.73228	5	172.21234	5	202.69241	5	233.17247	5	263.65253	5	294.13259
6	20.11684	6	50.59690	6	81.07696	6	111.55702	6	142.03708	6	172.51714	6	202.99721	6	233.47727	6	263.95733	6	294.43739
7	20.42164	7	50.90170	7	81.38176	7	111.86182	7	142.34188	7	172.82195	7	203.30201	7	233.78207	7	264.26213	7	294.74219
8	20.72644	8	51.20650	8	81.68656	8	112.16662	8	142.64669	8	173.12675	8	203.60681	8	234.08687	8	264.56693	8	295.04699
9	21.03124	9	51.51130	9	81.99136	9	112.47142	9	142.95149	9	173.43155	9	203.91161	9	234.39167	9	264.87173	9	295.35179
70	21.33604	170	51.81610	270	82.29616	370	112.77623	470	143.25629	570	173.73635	670	204.21641	770	234.69647	870	265.17653	970	295.65659
1	21.64084	1	52.12090	1	82.60097	1	113.08103	1	143.56109	1	174.04115	1	204.52121	1	235.00127	1	265.48133	1	295.96139
2	21.94564	2	52.42570	2	82.90577	2	113.38583	2	143.86589	2	174.34595	2	204.82601	2	235.30607	2	265.78613	2	296.26619
3	22.25044	3	52.73051	3	83.21057	3	113.69063	3	144.17069	3	174.65075	3	205.13081	3	235.61087	3	266.09093	3	296.57099
4	22.55525	4	53.03531	4	83.51537	4	113.99543	4	144.47549	4	174.95555	4	205.43561	4	235.91567	4	266.39573	4	296.87579
5	22.86005	5	53.34011	5	83.82017	5	114.30023	5	144.78029	5	175.26035	5	205.74041	5	236.22047	5	266.70053	5	297.18059
6	23.16485	6	53.64491	6	84.12497	6	114.60503	6	145.08509	6	175.56515	6	206.04521	6	236.52527	6	267.00533	6	297.48539
7	23.46965	7	53.94971	7	84.42977	7	114.90983	7	145.38989	7	175.86995	7	206.35001	7	236.83007	7	267.31013	7	297.79020
8	23.77445	8	54.25451	8	84.73457	8	115.21463	8	145.69469	8	176.17475	8	206.65481	8	237.13487	8	267.61494	8	298.09500
9	24.07925	9	54.55931	9	85.03937	9	115.51943	9	145.99949	9	176.47955	9	206.95961	9	237.43967	9	267.91974	9	298.39980
80	24.38405	180	54.86411	280	85.34417	380	115.82423	480	146.30429	580	176.78435	680	207.26441	780	237.74448	880	268.22454	980	298.70460
1	24.68885	1	55.16891	1	85.64897	1	116.12903	1	146.60909	1	177.08915	1	207.56922	1	238.04928	1	268.52934	1	299.00940
2	24.99365	2	55.47371	2	85.95377	2	116.43383	2	146.91389	2	177.39395	2	207.87402	2	238.35408	2	268.83414	2	299.31420
3	25.29845	3	55.77851	3	86.25857	3	116.73863	3	147.21869	3	177.69876	3	208.17882	3	238.65888	3	269.13894	3	299.61900
4	25.60325	4	56.08331	4	86.56337	4	117.04343	4	147.52350	4	178.00356	4	208.48362	4	238.96368	4	269.44374	4	299.92380
5	25.90805	5	56.38811	5	86.86817	5	117.34823	5	147.82830	5	178.30836	5	208.78842	5	239.26848	5	269.74854	5	300.22860
6	26.21285	6	56.69291	6	87.17297	6	117.65304	6	148.13310	6	178.61316	6	209.09322	6	239.57328	6	270.05334	6	300.53340
7	26.51765	7	56.99771	7	87.47777	7	117.95784	7	148.43790	7	178.91796	7	209.39802	7	239.87808	7	270.35814	7	300.83820
8	26.82245	8	57.30251	8	87.78258	8	118.26264	8	148.74270	8	179.22276	8	209.70282	8	240.18288	8	270.66294	8	301.14300
9	27.12725	9	57.60732	9	88.08738	9	118.56744	9	149.04750	9	179.52756	9	210.00762	9	240.48768	9	270.96774	9	301.44780
90	27.43205	190	57.91212	290	88.39218	390	118.87224	490	149.35230	590	179.83236	690	210.31242	790	240.79248	890	271.27254	990	301.75260
1	27.73686	1	58.21692	1	88.69698	1	119.17704	1	149.65710	1	180.13716	1	210.61722	1	241.09728	1	271.57734	1	302.05740
2	28.04166	2	58.52172	2	89.00178	2	119.48184	2	149.96190	2	180.44196	2	210.92202	2	241.40208	2	271.88214	2	302.36220
3	28.34646	3	58.82652	3	89.30658	3	119.78664	3	150.26670	3	180.74676	3	211.22682	3	241.70688	3	272.18694	3	302.66701
4	28.65126	4	59.13132	4	89.61138	4	120.09144	4	150.57150	4	181.05156	4	211.53162	4	242.01168	4	272.49174	4	302.97181
5	28.95606	5	59.43612	5	89.91618	5	120.39624	5	150.87630	5	181.35636	5	211.83642	5	242.31648	5	272.79655	5	303.27661
6	29.26086	6	59.74092	6	90.22098	6	120.70104	6	151.18110	6	181.66116	6	212.14122	6	242.62129	6	273.10135	6	303.58141
7	29.56566	7	60.04572	7	90.52578	7	121.00584	7	151.48590	7	181.96596	7	212.44602	7	242.92609	7	273.40615	7	303.88621
8	29.87046	8	60.35052	8	90.83058	8	121.31064	8	151.79070	8	182.27076	8	212.75083	8	243.23089	8	273.71095	8	304.19101
9	30.17526	9	60.65532	9	91.13538	9	121.61544	9	152.09550	9	182.57557	9	213.05563	9	243.53569	9	274.01575	9	304.49581

1 inch = .02540 meter.	4 inches = .10160 meter.	7 inches = .17780 meter.	10 inches = .25400 meter.
2 inches = .05080 meter.	5 inches = .12700 meter.	8 inches = .20320 meter.	11 inches = .27940 meter.
3 inches = .07620 meter.	6 inches = .15240 meter.	9 inches = .22860 meter.	12 inches = .30480 meter.

Lengths—Meters to feet (from 1 to 1,000 units).

[Reduction factor: 1 meter = 3.280833333 feet.]

Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.
0		100	328.08333	200	656.16667	300	984.25000	400	1,312.33333	500	1,640.41667	600	1,968.50000	700	2,296.58333	800	2,624.66667	900	2,952.75000
1	3.28083	1	331.36417	1	659.44750	1	987.53083	1	1,315.61417	1	1,643.69750	1	1,971.78083	1	2,299.86417	1	2,627.94750	1	2,956.03083
2	6.56167	2	334.64500	2	662.72833	2	990.81167	2	1,318.89500	2	1,646.97833	2	1,975.06167	2	2,303.14500	2	2,631.22833	2	2,959.31167
3	9.84250	3	337.92583	3	666.00917	3	994.09250	3	1,322.17583	3	1,650.25917	3	1,978.34250	3	2,306.42583	3	2,634.50917	3	2,962.59250
4	13.12333	4	341.20667	4	669.29000	4	997.37333	4	1,325.45667	4	1,653.54000	4	1,981.62333	4	2,309.70667	4	2,637.79000	4	2,965.87333
5	16.40417	5	344.48750	5	672.57083	5	1,000.65417	5	1,328.73750	5	1,656.82083	5	1,984.90417	5	2,312.98750	5	2,641.07083	5	2,969.15417
6	19.68500	6	347.76833	6	675.85167	6	1,003.93500	6	1,332.01833	6	1,660.10167	6	1,988.18500	6	2,316.26833	6	2,644.35167	6	2,972.43500
7	22.96583	7	351.04917	7	679.13250	7	1,007.21583	7	1,335.29917	7	1,663.38250	7	1,991.46583	7	2,319.54917	7	2,647.63250	7	2,975.71583
8	26.24667	8	354.33000	8	682.41333	8	1,010.49667	8	1,338.58000	8	1,666.66333	8	1,994.74667	8	2,322.83000	8	2,650.91333	8	2,978.99667
9	29.52750	9	357.61083	9	685.69417	9	1,013.77750	9	1,341.86083	9	1,669.94417	9	1,998.02750	9	2,326.11083	9	2,654.19417	9	2,982.27750
10	32.80833	110	360.89167	210	688.97500	310	1,017.05833	410	1,345.14167	510	1,673.22500	610	2,001.30833	710	2,329.39167	810	2,657.47500	910	2,985.55833
1	36.08917	1	364.17250	1	692.25583	1	1,020.33917	1	1,348.42250	1	1,676.50583	1	2,004.58917	1	2,332.67250	1	2,660.75583	1	2,988.83917
2	39.37000	2	367.45333	2	695.53667	2	1,023.62000	2	1,351.70333	2	1,679.78667	2	2,007.87000	2	2,335.95333	2	2,664.03667	2	2,992.12000
3	42.65083	3	370.73417	3	698.81750	3	1,026.90083	3	1,354.98417	3	1,683.06750	3	2,011.15083	3	2,339.23417	3	2,667.31750	3	2,995.40083
4	45.93167	4	374.01500	4	702.09833	4	1,030.18167	4	1,358.26500	4	1,686.34833	4	2,014.43167	4	2,342.51500	4	2,670.59833	4	2,998.68167
5	49.21250	5	377.29583	5	705.37917	5	1,033.46250	5	1,361.54583	5	1,689.62917	5	2,017.71250	5	2,345.79583	5	2,673.87917	5	3,001.96250
6	52.49333	6	380.57667	6	708.66000	6	1,036.74333	6	1,364.82667	6	1,692.91000	6	2,020.99333	6	2,349.07667	6	2,677.16000	6	3,005.24333
7	55.77417	7	383.85750	7	711.94083	7	1,040.02417	7	1,368.10750	7	1,696.19083	7	2,024.27417	7	2,352.35750	7	2,680.44083	7	3,008.52417
8	59.05500	8	387.13833	8	715.22167	8	1,043.30500	8	1,371.38833	8	1,699.47167	8	2,027.55500	8	2,355.63833	8	2,683.72167	8	3,011.80500
9	62.33583	9	390.41917	9	718.50250	9	1,046.58583	9	1,374.66917	9	1,702.75250	9	2,030.83583	9	2,358.91917	9	2,687.00250	9	3,015.08583
20	65.61667	120	393.70000	220	721.78333	320	1,049.86667	420	1,377.95000	520	1,706.03333	620	2,034.11667	720	2,362.20000	820	2,690.28333	920	3,018.36667
1	68.89750	1	396.98083	1	725.06417	1	1,053.14750	1	1,381.23083	1	1,709.31417	1	2,037.39750	1	2,365.48083	1	2,693.56417	1	3,021.64750
2	72.17833	2	400.26167	2	728.34500	2	1,056.42833	2	1,384.51167	2	1,712.59500	2	2,040.67833	2	2,368.76167	2	2,696.84500	2	3,024.92833
3	75.45917	3	403.54250	3	731.62583	3	1,059.70917	3	1,387.79250	3	1,715.87583	3	2,043.95917	3	2,372.04250	3	2,700.12583	3	3,028.20917
4	78.74000	4	406.82333	4	734.90667	4	1,062.99000	4	1,391.07333	4	1,719.15667	4	2,047.24000	4	2,375.32333	4	2,703.40667	4	3,031.49000
5	82.02083	5	410.10417	5	738.18750	5	1,066.27083	5	1,394.35417	5	1,722.43750	5	2,050.52083	5	2,378.60417	5	2,706.68750	5	3,034.77083
6	85.30167	6	413.38500	6	741.46833	6	1,069.55167	6	1,397.63500	6	1,725.71833	6	2,053.80167	6	2,381.88500	6	2,709.96833	6	3,038.05167
7	88.58250	7	416.66583	7	744.74917	7	1,072.83250	7	1,400.91583	7	1,728.99917	7	2,057.08250	7	2,385.16583	7	2,713.24917	7	3,041.33250
8	91.86333	8	419.94667	8	748.03000	8	1,076.11333	8	1,404.19667	8	1,732.28000	8	2,060.36333	8	2,388.44667	8	2,716.53000	8	3,044.61333
9	95.14417	9	423.22750	9	751.31083	9	1,079.39417	9	1,407.47750	9	1,735.56083	9	2,063.64417	9	2,391.72750	9	2,719.81083	9	3,047.89417
30	98.42500	130	426.50833	230	754.59167	330	1,082.67500	430	1,410.75833	530	1,738.84167	630	2,066.92500	730	2,395.00833	830	2,723.09167	930	3,051.17500
1	101.70583	1	429.78917	1	757.87250	1	1,085.95583	1	1,414.03917	1	1,742.12250	1	2,070.20583	1	2,398.28917	1	2,726.37250	1	3,054.45583
2	104.98667	2	433.07000	2	761.15333	2	1,089.23667	2	1,417.32000	2	1,745.40333	2	2,073.48667	2	2,401.57000	2	2,729.65333	2	3,057.73667
3	108.26750	3	436.35083	3	764.43417	3	1,092.51750	3	1,420.60083	3	1,748.68417	3	2,076.76750	3	2,404.85083	3	2,732.93417	3	3,061.01750
4	111.54833	4	439.63167	4	767.71500	4	1,095.79833	4	1,423.88167	4	1,751.96500	4	2,080.04833	4	2,408.13167	4	2,736.21500	4	3,064.29833
5	114.82917	5	442.91250	5	770.99583	5	1,099.07917	5	1,427.16250	5	1,755.24583	5	2,083.32917	5	2,411.41250	5	2,739.49583	5	3,067.57917
6	118.11000	6	446.19333	6	774.27667	6	1,102.36000	6	1,430.44333	6	1,758.52667	6	2,086.61000	6	2,414.69333	6	2,742.77667	6	3,070.86000
7	121.39083	7	449.47417	7	777.55750	7	1,105.64083	7	1,433.72417	7	1,761.80750	7	2,089.89083	7	2,417.97417	7	2,746.05750	7	3,074.14083
8	124.67167	8	452.75500	8	780.83833	8	1,108.92167	8	1,437.00500	8	1,765.08833	8	2,093.17167	8	2,421.25500	8	2,749.33833	8	3,077.42167
9	127.95250	9	456.03583	9	784.11917	9	1,112.20250	9	1,440.28583	9	1,768.36917	9	2,096.45250	9	2,424.53583	9	2,752.61917	9	3,080.70250
40	131.23333	140	459.31667	240	787.40000	340	1,115.48333	440	1,443.56667	540	1,771.65000	640	2,099.73333	740	2,427.81667	840	2,755.90000	940	3,083.98333
1	134.51417	1	462.59750	1	790.68083	1	1,116.76417	1	1,446.84750	1	1,774.93083	1	2,103.01417	1	2,431.09750	1	2,759.18083	1	3,087.26417
2	137.79500	2	465.87833	2	793.96167	2	1,122.04500	2	1,450.12833	2	1,778.21167	2	2,106.29500	2	2,434.37833	2	2,762.46167	2	3,090.54500
3	141.07583	3	469.15917	3	797.24250	3	1,125.32583	3	1,453.40917	3	1,781.49250	3	2,109.57583	3	2,437.65917	3	2,765.74250	3	3,093.82583
4	144.35667	4	472.44000	4	800.52333	4	1,128.60667	4	1,456.69000	4	1,784.77333	4	2,112.85667	4	2,440.94000	4	2,769.02333	4	3,097.10667
5	147.63750	5	475.72083	5	803.80417	5	1,131.88750	5	1,459.97083	5	1,788.05417	5	2,116.13750	5	2,444.22083	5	2,772.30417	6	3,100.38750
6	150.91833	6	479.00167	6	807.08500	6	1,135.16833	6	1,463.25167	6	1,791.33500	6	2,119.41833	6	2,447.50167	6	2,775.58500	6	3,103.66833
7	154.19917	7	482.28250	7	810.36583	7	1,138.44917	7	1,466.53250	7	1,794.61583	7	2,122.69917	7	2,450.78250	7	2,778.86583	7	3,106.94917
8	157.48000	8	485.56333	8	813.64667	8	1,141.73000	8	1,469.81333	8	1,797.89667	8	2,125.98000	8	2,454.06333	8	2,782.14667	8	3,110.23000
9	160.76083	9	488.84417	9	816.92750	9	1,145.01083	9	1,473.09417	9	1,801.17750	9	2,129.26083	9	2,457.34417	9	2,785.42750	9	3,113.51083

50	164.04167	**150**	492.12500	**250**	820.20833	**350**	1,148.29167	**450**	1,476.37500	**550**	1,804.45833	**650**	2,132.54167	**750**	2,460.62500	**850**	2,788.70833	**950**	3,116.79167
1	167.32250	1	495.40583	1	823.48917	1	1,151.57250	1	1,479.65583	1	1,807.73917	1	2,135.82250	1	2,463.90583	1	2,791.98917	1	3,120.07250
2	170.60333	2	498.68667	2	826.77000	2	1,154.85333	2	1,482.93667	2	1,811.02000	2	2,139.10333	2	2,467.18667	2	2,795.27000	2	3,123.35333
3	173.88417	3	501.96750	3	830.05083	3	1,158.13417	3	1,486.21750	3	1,814.30083	3	2,142.38417	3	2,470.46750	3	2,798.55083	3	3,126.63417
4	177.16500	4	505.24833	4	833.33167	4	1,161.41500	4	1,489.49833	4	1,817.58167	4	2,145.66500	4	2,473.74833	4	2,801.83167	4	3,129.91500
5	180.44583	5	508.52917	5	836.61250	5	1,164.69583	5	1,492.77917	5	1,820.86250	5	2,148.94583	5	2,477.02917	5	2,805.11250	5	3,133.19583
6	183.72667	6	511.81000	6	839.89333	6	1,167.97667	6	1,496.06000	6	1,824.14333	6	2,152.22667	6	2,480.31000	6	2,808.39333	6	3,136.47667
7	187.00750	7	515.09083	7	843.17417	7	1,171.25750	7	1,499.34083	7	1,827.42417	7	2,155.50750	7	2,483.59083	7	2,811.67417	7	3,139.75750
8	190.28833	8	518.37167	8	846.45500	8	1,174.53833	8	1,502.62167	8	1,830.70500	8	2,158.78833	8	2,486.87167	8	2,814.95500	8	3,143.03833
9	193.56917	9	521.65250	9	849.73583	9	1,177.81917	9	1,505.90250	9	1,833.98583	9	2,162.06917	9	2,490.15250	9	2,818.23583	9	3,146.31917
60	196.85000	**160**	524.93333	**260**	853.01667	**360**	1,181.10000	**460**	1,509.18333	**560**	1,837.26667	**660**	2,165.35000	**760**	2,493.43333	**860**	2,821.51667	**960**	3,149.60000
1	200.13083	1	528.21417	1	856.29750	1	1,184.38083	1	1,512.46417	1	1,840.54750	1	2,168.63083	1	2,496.71417	1	2,824.79750	1	3,152.88083
2	203.41167	2	531.49500	2	859.57833	2	1,187.66167	2	1,515.74500	2	1,843.82833	2	2,171.91167	2	2,499.99500	2	2,828.07833	2	3,156.16167
3	206.69250	3	534.77583	3	862.85917	3	1,190.94250	3	1,519.02583	3	1,847.10917	3	2,175.19250	3	2,503.27583	3	2,831.35917	3	3,159.44250
4	209.97333	4	538.05667	4	866.14000	4	1,194.22333	4	1,522.30667	4	1,850.39000	4	2,178.47333	4	2,506.55667	4	2,834.64000	4	3,162.72333
5	213.25417	5	541.33750	5	869.42083	5	1,197.50417	5	1,525.58750	5	1,853.67083	5	2,181.75417	5	2,509.83750	5	2,837.92083	5	3,166.00417
6	216.53500	6	544.61833	6	872.70167	6	1,200.78500	6	1,528.86833	6	1,856.95167	6	2,185.03500	6	2,513.11833	6	2,841.20167	6	3,169.28500
7	219.81583	7	547.89917	7	875.98250	7	1,204.06583	7	1,532.14917	7	1,860.23250	7	2,188.31583	7	2,516.39917	7	2,844.48250	7	3,172.56583
8	223.09667	8	551.18000	8	879.26333	8	1,207.34667	8	1,535.43000	8	1,863.51333	8	2,191.59667	8	2,519.68000	8	2,847.76333	8	3,175.84667
9	226.37750	9	554.46083	9	882.54417	9	1,210.62750	9	1,538.71083	9	1,866.79417	9	2,194.87750	9	2,522.96083	9	2,851.04417	9	3,179.12750
70	229.65833	**170**	557.74167	**270**	885.82500	**370**	1,213.90833	**470**	1,541.99167	**570**	1,870.07500	**670**	2,198.15833	**770**	2,526.24167	**870**	2,854.32500	**970**	3,182.40833
1	232.93917	1	561.02250	1	889.10583	1	1,217.18917	1	1,545.27250	1	1,873.35583	1	2,201.43917	1	2,529.52250	1	2,857.60583	1	3,185.68917
2	236.22000	2	564.30333	2	892.38667	2	1,220.47000	2	1,548.55333	2	1,876.63667	2	2,204.72000	2	2,532.80333	2	2,860.88667	2	3,188.97000
3	239.50083	3	567.58417	3	895.66750	3	1,223.75083	3	1,551.83417	3	1,879.91750	3	2,208.00083	3	2,536.08417	3	2,864.16750	3	3,192.25083
4	242.78167	4	570.86500	4	898.94833	4	1,227.03167	4	1,555.11500	4	1,883.19833	4	2,211.28167	4	2,539.36500	4	2,867.44833	4	3,195.53167
5	246.06250	5	574.14583	5	902.22917	5	1,230.31250	5	1,558.39583	5	1,886.47917	5	2,214.56250	5	2,542.64583	5	2,870.72917	5	3,198.81250
6	249.34333	6	577.42667	6	905.51000	6	1,233.59333	6	1,561.67667	6	1,889.76000	6	2,217.84333	6	2,545.92667	6	2,874.01000	6	3,202.09333
7	252.62417	7	580.70750	7	908.79083	7	1,236.87417	7	1,564.95750	7	1,893.04083	7	2,221.12417	7	2,549.20750	7	2,877.29083	7	3,205.37417
8	255.90500	8	583.98833	8	912.07167	8	1,240.15500	8	1,568.23833	8	1,896.32167	8	2,224.40500	8	2,552.48833	8	2,880.57167	8	3,208.65500
9	259.18583	9	587.26917	9	915.35250	9	1,243.43583	9	1,571.51917	9	1,899.60250	9	2,227.68583	9	2,555.76917	9	2,883.85250	9	3,211.93583
80	262.46667	**180**	590.55000	**280**	918.63333	**380**	1,246.71667	**480**	1,574.80000	**580**	1,902.88333	**680**	2,230.96667	**780**	2,559.05000	**880**	2,887.13333	**980**	3,215.21667
1	265.74750	1	593.83083	1	921.91417	1	1,249.99750	1	1,578.08083	1	1,906.16417	1	2,234.24750	1	2,562.33083	1	2,890.41417	1	3,218.49750
2	269.02833	2	597.11167	2	925.19500	2	1,253.27833	2	1,581.36167	2	1,909.44500	2	2,237.52833	2	2,565.61167	2	2,893.69500	2	3,221.77833
3	272.30917	3	600.39250	3	928.47583	3	1,256.55917	3	1,584.64250	3	1,912.72583	3	2,240.80917	3	2,568.89250	3	2,896.97583	3	3,225.05917
4	275.59000	4	603.67333	4	931.75667	4	1,259.84000	4	1,587.92333	4	1,916.00667	4	2,244.09000	4	2,572.17333	4	2,900.25667	4	3,228.34000
5	278.87083	5	606.95417	5	935.03750	5	1,263.12083	5	1,591.20417	5	1,919.28750	5	2,247.37083	5	2,575.45417	5	2,903.53750	5	3,231.62083
6	282.15167	6	610.23500	6	938.31833	6	1,266.40167	6	1,594.48500	6	1,922.56833	6	2,250.65167	6	2,578.73500	6	2,906.81833	6	3,234.90167
7	285.43250	7	613.51583	7	941.59917	7	1,269.68250	7	1,597.76583	7	1,925.84917	7	2,253.93250	7	2,582.01583	7	2,910.09917	7	3,238.18250
8	288.71333	8	616.79667	8	944.88000	8	1,272.96333	8	1,601.04667	8	1,929.13000	8	2,257.21333	8	2,585.29667	8	2,913.38000	8	3,241.46333
9	291.99417	9	620.07750	9	948.16083	9	1,276.24417	9	1,604.32750	9	1,932.41083	9	2,260.49417	9	2,588.57750	9	2,916.66083	9	3,244.74417
90	295.27500	**190**	623.35833	**290**	951.44167	**390**	1,279.52500	**490**	1,607.60833	**590**	1,935.69167	**690**	2,263.77500	**790**	2,591.85833	**890**	2,919.94167	**990**	3,248.02500
1	298.55583	1	626.63917	1	954.72250	1	1,282.80583	1	1,610.88917	1	1,938.97250	1	2,267.05583	1	2,595.13917	1	2,923.22250	1	3,251.30583
2	301.83667	2	629.92000	2	958.00333	2	1,286.08667	2	1,614.17000	2	1,942.25333	2	2,270.33667	2	2,598.42000	2	2,926.50333	2	3,254.58667
3	305.11750	3	633.20083	3	961.28417	3	1,289.36750	3	1,617.45083	3	1,945.53417	3	2,273.61750	3	2,601.70083	3	2,929.78417	3	3,257.86750
4	308.39833	4	636.48167	4	964.56500	4	1,292.64833	4	1,620.73167	4	1,948.81500	4	2,276.89833	4	2,604.98167	4	2,933.06500	4	3,261.14833
5	311.67917	5	639.76250	5	967.84583	5	1,295.92917	5	1,624.01250	5	1,952.09583	5	2,280.17917	5	2,608.26250	5	2,936.34583	5	3,264.42917
6	314.96000	6	643.04333	6	971.12667	6	1,299.21000	6	1,627.29333	6	1,955.37667	6	2,283.46000	6	2,611.54333	6	2,939.62667	6	3,267.71000
7	318.24083	7	646.32417	7	974.40750	7	1,302.49083	7	1,630.57417	7	1,958.65750	7	2,286.74083	7	2,614.82417	7	2,942.90750	7	3,270.99083
8	321.52167	8	649.60500	8	977.68833	8	1,305.77167	8	1,633.85500	8	1,961.93833	8	2,290.02167	8	2,618.10500	8	2,946.18833	8	3,274.27167
9	324.80250	9	652.88583	9	980.96917	9	1,309.05250	9	1,637.13583	9	1,965.21917	9	2,293.30250	9	2,621.38583	9	2,949.46917	9	3,277.55250

GEOGRAPHIC POSITIONS.

Mouth of the Columbia River to Portland.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Scarboro Hill 2, 1873	46 15 29.576	913.2	330 47 02.6	150 57 02.8	Saddle Mountain 2	36736.3	4.565095
	123 54 57.105	1223.1	6 45 52.0	186 43 42.8	Tillamook Head	32774.5	4.515536
East Battery, 1911	46 16 46.107	1423.6	283 22 29.1	103 28 03.3	Scarboro Hill 2	10180.9	4.007786
	124 02 39.557	846.9	320 57 34.9	141 13 08.6	Saddle Mountain 2	44275.6	4.646164
			350 05 33.4	170 08 57.6	Tillamook Head	35436.0	4.549445
East Battery reference mark No. 1,[1] 1911.	46 16 45.893	1417.0	225 23	45 23	East Battery	9.42	0.97405
	124 02 39.870	853.6					
East Battery reference mark No. 2,[1] 1911.	46 16 46.040	1421.6	244 09	64 09	East Battery	4.71	0.67302
	124 02 39.755	851.2					
East Battery reference mark No. 3,[1] 1911.	46 16 46.214	1426.9	300 25	120 25	East Battery	6.54	0.81558
	124 02 39.820	852.5					
Battery, 1873	46 16 37.486	1157.5	281 36 22.4	101 42 05.4	Scarboro Hill 2	10380.3	4.016212
	124 02 51.852	1110.2	320 28 30.6	140 44 13.3	Saddle Mountain 2	44236.0	4.645776
			349 35 37.6	169 39 10.6	Tillamook Head	35220.4	4.546794
Fort Stevens Longitude, 1911	46 12 27.600	852.2	141 12 57.4	321 09 20.9	East Battery	10243.8	4.010461
	123 57 39.853	854.3	211 48 35.6	31 50 33.1	Scarboro Hill 2	6613.0	3.820396
North Head Lighthouse, 1909	46 17 57.855	1786.4	317 35 47.7	137 37 04.2	Battery	3360.1	3.526349
	124 04 37.681	806.5	346 53 47.8	166 58 37.1	Tillamook Head	38112.2	4.581064
			353 29 34.8	173 32 08.2	Tillamook Rock Lighthouse	40456.7	4.606990
Point Adams (unused) Lighthouse, 1909.	46 11 37.388	1154.5	148 48 27.2	328 45 17.9	Battery	10834.9	4.034825
	123 58 29.760	638.1	212 26 19.6	32 27 53.1	Scarboro Hill 2	8495.0	3.929165
Desdemona Sands Lighthouse, 1909	46 13 32.471	1002.6	24 11 43.5	204 10 49.8	Point Adams (unused) Lighthouse.	3895.3	3.590543
	123 57 15.307	328.0	128 25 41.0	308 21 37.9	Battery	9198.0	3.963695
			219 17 57.0	39 19 36.8	Scarboro Hill 2	4673.4	3.669634
Fort Stevens Wharf Light, 1909	46 12 32.543	1004.9	135 35 08.6	315 30 58.6	Battery	10594.2	4.025070
	123 57 05.562	119.2	206 42 54.1	26 44 26.9	Scarboro Hill 2	6120.0	3.786755
Cape Disappointment Lighthouse, 1873.	46 16 34.750	1073.0	280 51 40.4	100 57 32.7	Scarboro Hill 2	10632.2	4.026623
	124 03 04.629	99.1	320 07 50.0	140 23 41.8	Saddle Mountain 2	44345.8	4.646853
			314 14 07.4	134 19 35.6	Tansey Point 2	13600.7	4.133562
Island (U. S. E.), 1913	46 15 37.690	1163.8	109 20 24.2	289 17 00.8	East Battery	6387.8	3.805349
	123 57 58.035	1242.9	346 40 31.7	166 41 02.6	Desdemona Sands Light	3973.2	3.599141
			356 12 02.0	176 12 15.1	Fort Stevens Longitude	5882.2	3.769540
Island (U. S. E.) reference mark,[1] 1913.	46 15 36.498	1126.9	224 03 11	44 03 12	Island (U. S. E.)	51.22	1.70944
	123 57 59.698	1278.6					
Astoria, St. Mary's Hospital cross, 1909.	46 11 19.887	614.1	102 59 13.4	282 53 44.7	Fort Stevens Wharf Light	10017.1	4.000741
	123 49 30.236	648.4	119 48 09.3	299 38 30.5	Battery	19779.0	4.296204
			137 46 22.1	317 42 26.1	Scarboro Hill 2	10416.8	4.017735
Tansy Point 2, 1873	46 11 27.210	840.2	135 23 45.8	315 18 26.9	Battery	13466.0	4.129239
	123 55 30.208	647.8	185 24 44.2	5 25 08.1	Scarboro Hill 2	7516.9	3.876040
Smith Point, 1851	46 10 50.120	1547.6	102 38 17.7	282 35 25.5	Tansy Point 2	5244.0	3.719662
	123 51 31.590	677.5	126 24 42.8	306 16 31.6	Battery	18098.1	4.257632
			152 58 36.7	332 56 08.3	Scarboro Hill 2	9687.9	3.986228
Scarboro Hill, 1851	46 15 22.608	698.1	331 23 55.2	151 26 29.6	Smith Point	9580.9	3.981405
	123 55 05.431	116.3	4 10 51.6	184 10 33.7	Tansy Point 2	7287.6	3.862555
			103 04 45.9	282 59 09.0	Battery	10252.3	4.010622
Tansy Point, 1851	46 11 24.702	762.8	183 26 39.2	3 26 54.1	Scarboro Hill	7359.0	3.866817
	123 55 26.072	559.1	281 57 51.6	102 00 40.8	Smith Point	5140.9	3.711036
Point Adams, 1851	46 12 32.595	1006.5	213 20 30.4	33 22 26.9	Scarboro Hill	6284.8	3.798291
	123 57 46.707	1001.4	304 47 35.5	124 49 17.0	Tansy Point	3672.4	3.564950
Cape Disappointment, 1851	46 16 46.255	1428.3	284 52 03.2	104 57 30.4	Scarboro Hill	10035.8	4.001550
	124 02 38.297	819.9	321 23 43.1	141 27 13.7	Point Adams	10018.2	4.000790
Baker east base, 1851	46 18 14.932	461.1	319 59 31.7	140 02 02.3	Scarboro Hill	6944.5	3.841639
	123 58 33.873	725.0	62 23 58.3	242 21 01.6	Cape Disappointment	5905.0	3.771222
Baker west base, 1851	46 18 54.303	1676.8	293 09 15.6	113 10 51.6	Baker east base	3090.0	3.489954
	124 00 46.633	997.7	31 09 46.6	211 08 25.9	Cape Disappointment	4619.9	3.664634
Point Ellice, 1851	46 14 30.663	946.8	34 56 48.4	214 54 33.4	Tansy Point	7003.3	3.845300
	123 52 19.003	407.1	62 35 58.7	242 32 02.1	Point Adams	7912.7	3.898325
Astor Point, 1851	46 11 29.759	918.9	88 39 20.4	268 35 41.5	Tansy Point	6508.3	3.813465
	123 50 22.660	485.9	101 33 45.8	281 28 25.3	Point Adams	9716.2	3.987498
			139 54 01.5	319 50 37.3	Scarboro Hill	9402.9	3.973262
			155 57 11.7	335 55 47.7	Point Ellice	6117.0	3.786539

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Grays Point, 1851	46 16 27.321	843.6	32 09 58.7	212 06 44.2	Astor Point	10850.4	4.035444
	123 45 53.282	1140.9	66 28 52.4	246 24 13.7	Point Ellice	9012.5	3.954843
Tongue Point, 1851	46 12 48.310	1491.6	109 37 34.3	289 32 35.0	Point Ellice	9428.1	3.974426
	123 45 24.501	525.2	174 47 34.5	354 47 13.7	Grays Point	6790.3	3.831892
Rocky Point, 1851	46 15 38.304	1182.7	64 55 32.4	244 49 15.2	Tongue Point	12361.2	4.092059
	123 36 42.175	903.3	97 21 47.4	277 15 09.2	Grays Point	11898.2	4.075483
Indian Point, 1852	46 10 45.884	1416.7	111 47 42.8	291 42 23.9	Tongue Point	10200.6	4.008625
	123 38 02.641	56.6	190 48 20.8	10 49 18.9	Rocky Point	9192.1	3.963415
Cathlamet Point, 1851	46 14 00.036	1.1	56 40 26.8	236 35 20.3	Indian Point	10899.0	4.037388
	123 30 58.054	1244.0	112 24 21.5	292 20 12.9	Rocky Point	7971.9	3.901560
Jim Crow Point, 1851	46 15 39.931	1232.9	310 09 40.5	130 11 43.7	Cathlamet Point	4780.8	3.679499
	123 33 48.564	1040.1	30 58 49.0	210 55 45.6	Indian Point	10587.0	4.024772
Three Tree Point, 1851	46 16 03.673	113.4	356 12 49.6	176 12 58.1	Cathlamet Point	3825.9	3.582728
	123 31 09.843	210.8	77 50 42.6	257 48 47.9	Jim Crow Point	3477.2	3.541234
Aldrich, 1871	46 14 06.665	205.8	125 45 38.9	305 43 24.0	Jim Crow Point	4929.9	3.692836
	123 30 41.774	895.1	170 33 15.2	350 32 54.9	Three Tree Point	3662.5	3.563778
Skumaquea, 1871	46 16 18.907	583.8	48 36 06.9	228 33 30.8	Aldrich	6172.0	3.790423
	123 27 05.700	122.1	84 52 59.9	264 50 03.5	Three Tree Point	5249.0	3.720080
Quinn, 1871	46 13 36.188	1117.3	147 34 15.1	327 32 37.5	Three Tree Point	5396.0	3.732069
	123 28 54.716	1172.6	204 55 06.7	24 56 25.4	Skumaquea	5540.4	3.743540
Lokamin, 1871	46 14 32.240	995.4	76 27 49.4	256 23 47.8	Quinn	7376.2	3.867833
	123 23 20.061	430.3	124 17 55.7	304 15 12.7	Skumaquea	5848.0	3.767007
Hunts Mill Point, 1871	46 11 39.722	1226.5	134 20 44.4	314 18 40.5	Quinn	5146.2	3.711490
	123 26 02.964	64.0	213 13 40.0	33 15 37.6	Lokamin	6369.1	3.804075
Birnie, 1871	46 11 56.792	1753.5	82 48 52.9	262 46 32.6	Hunts Mill Point	4202.6	3.623513
	123 22 48.533	1040.6	171 59 04.2	351 58 41.4	Lokamin	4847.0	3.685477
Westport, 1871	46 07 56.489	1744.2	148 27 19.8	328 24 57.5	Hunts Mill Point	8089.3	3.907913
	123 22 45.620	979.3	179 31 03.6	359 31 01.5	Birnie	7419.9	3.870397
Anderson, 1872	46 09 54.059	1669.1	47 47 59.9	227 45 45.4	Westport	5402.2	3.732572
	123 19 39.194	840.9	111 39 30.0	291 34 53.1	Hunts Mill Point	8854.6	3.947171
Woods, 1873	46 06 46.373	1431.8	115 10 53.8	295 08 19.1	Westport	5092.0	3.706892
	123 19 10.958	235.3	174 01 56.6	354 01 36.3	Anderson	5826.6	3.765413
Cape Horn, 1873	46 09 09.977	306.0	29 02 21.9	209 00 59.3	Woods	5070.9	3.705083
	123 17 16.335	350.5	72 14 01.0	252 10 03.6	Westport	7422.7	3.870563
Clatskanie, 1873	46 07 13.156	406.2	82 46 27.6	262 42 49.6	Woods	6547.3	3.816059
	123 14 08.493	182.4	131 50 00.4	311 47 45.0	Cape Horn	5410.0	3.733194
Cooper, 1873	46 09 30.963	956.0	342 02 46.9	162 03 33.2	Clatskanie	4472.6	3.650557
	123 15 12.701	272.5	45 12 22.4	225 09 30.6	Woods	7209.8	3.857924
Bradbury, 1873	46 09 11.460	353.8	59 44 28.8	239 40 58.8	Clatskanie	7242.6	3.859892
	123 09 17.138	367.8	94 32 54.7	274 28 38.3	Cooper	7653.3	3.883849
Abernathy, 1873	46 11 16.009	494.3	331 49 28.6	151 50 37.8	Bradbury	4362.1	3.639697
	123 10 53.120	1139.2	59 48 22.4	239 45 15.1	Cooper	6444.0	3.809156
Nequally, 1873	46 11 24.019	741.6	22 49 37.2	202 48 39.3	Bradbury	4440.4	3.647425
	123 07 56.859	1219.3	86 16 26.9	266 14 19.7	Abernathy	3788.0	3.578407
Stoughton, 1873	46 10 06.131	189.3	121 36 59.9	301 35 01.9	Abernathy	4117.6	3.614642
	123 08 09.614	206.2	186 29 20.2	6 29 29.4	Nequally	2420.4	3.383887
Greens Point, 1873	46 10 00.249	7.7	93 23 07.9	273 21 24.2	Stoughton	3088.3	3.489722
	123 05 45.907	984.8	132 39 13.7	312 37 39.2	Nequally	3818.3	3.581867
Coal Creek Ridge, 1873	46 10 52.624	1624.8	69 04 56.5	249 02 34.4	Greens Point	4525.4	3.655658
	123 02 28.868	619.1	97 52 45.1	277 48 48.5	Nequally	7100.6	3.851295
Mount Solo, 1873	46 09 23.903	738.0	99 45 19.7	279 41 39.6	Greens Point	6643.6	3.822403
	123 00 40.710	873.5	139 44 45.2	319 43 27.2	Coal Creek Ridge	3589.9	3.555088
Rinearson, 1873	46 07 57.555	1777.1	180 27 00.1	0 27 01.5	Coal Creek Ridge	5405.6	3.732843
	123 02 30.846	662.2	221 32 58.7	41 34 18.1	Mount Solo	3563.1	3.551822
Huntington, 1873	46 09 09.530	294.2	72 06 39.3	252 02 48.5	Rinearson	7222.1	3.858662
	122 57 10.680	229.2	115 01 55.5	294 58 06.0	Coal Creek Ridge	7531.9	3.876903
Rainier, 1873	46 05 11.963	369.4	119 26 33.8	299 21 29.4	Rinearson	10414.9	4.017654
	122 55 28.342	608.9	163 20 00.6	343 18 46.9	Huntington	7657.1	3.884066
Coweman, 1873	46 06 26.668	824.0	57 56 33.7	237 54 30.2	Rainier	4344.8	3.637968
	122 52 36.950	793.6	130 34 41.4	310 31 24.2	Huntington	7733.8	3.888392

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Mount Coffin, 1873	46 07 47.153	1455.9	226 03 28.0	46 04 56.7	Huntington	3666.1	3.564208
	122 59 13.693	294.0	286 13 07.6	106 17 53.5	Coweman	8873.8	3.948112
Mount Coffin reference mark,[1] 1913	46 07 46.158	1425.2	176 00 43	356 00 43	Mount Coffin	30.8	1.48855
	122 59 13.593	291.8					
Warren, 1873	46 05 03.563	110.0	132 38 35.0	312 35 30.9	Mount Coffin	7459.7	3.872720
	122 54 58.090	1248.2	229 44 13.8	49 45 55.5	Coweman	3972.3	3.599042
Carrolls Point, 1873	46 04 09.408	290.5	114 01 02.4	293 58 56.5	Warren	4111.0	3.613947
	122 52 03.317	71.3	170 19 45.6	350 19 21.4	Coweman	4299.8	3.633444
Galloway, 1873	46 04 00.965	29.8	197 01 18.5	17 02 04.7	Coweman	4705.6	3.672614
	122 53 41.088	883.1	262 55 05.4	82 56 15.8	Carrolls Point	2117.4	3.325800
Carr, 1873	46 02 44.830	1384.3	160 16 30.0	340 16 01.8	Galloway	2497.3	3.397467
	122 53 01.871	40.2	205 43 41.9	25 44 24.1	Carrolls Point	2898.9	3.462232
Carr reference mark,[1] 1913	46 02 44.056	1360.2	180 30 50	0 30 50	Carr	23.9	1.37840
	122 53 01.881	40.4					
Drays Mound, 1873	46 02 38.690	1194.6	95 52 40.8	275 51 39.1	Carr	1853.8	3.268059
	122 51 36.103	776.3	133 24 26.7	313 22 56.7	Galloway	3697.5	3.567909
			344 33 47.9	164 34 35.2	Rocky Ridge	5313.1	3.725346
Gobles Point, 1873	46 01 04.653	143.7	167 50 31.7	347 50 09.4	Carr	3164.0	3.500237
	122 52 30.877	664.2	202 04 41.2	22 05 20.6	Drays Mound	3133.3	3.496002
			310 32 19.2	130 33 45.9	Rocky Ridge	3411.9	3.532994
			343 45 17.2	163 45 45.9	Hunter	3068.2	3.486885
Rocky Ridge, 1878	45 59 52.811	1630.5	332 42 48.2	152 43 34.2	Hoffman	3002.0	3.477413
	122 50 30.382	653.7	25 29 33.4	205 28 25.3	Merrill	4740.1	3.675790
			67 16 28.2	247 15 30.2	Hunter	1881.1	3.274419
Hunter, 1873	45 59 29.266	903.6	301 56 42.5	121 58 26.4	Hoffman	3667.3	3.564343
	122 51 51.003	1097.6	307 26 38.7	127 28 58.4	Martins Bluff	5270.2	3.721826
			4 53 32.4	184 53 22.2	Merrill	3565.0	3.552059
Hoffman, 1878	45 58 26.395	814.9	319 42 50.4	139 43 26.2	Martins Bluff	1657.5	3.219446
	122 49 26.454	569.5	64 46 15.8	244 44 21.7	Merrill	3777.0	3.577149
Martins Bluff, 1878	45 57 45.441	1402.9	308 55 50.1	128 58 10.2	Burnt Hill	5399.4	3.732346
	122 48 36.682	789.8	359 46 04.9	179 46 05.9	Adams	7054.1	3.848442
Martins Bluff reference mark,[1] 1913	45 57 45.523	1405.5	75 00 50	255 00 50	Martins Bluff	9.78	0.99034
	122 48 36.243	780.4					
Merrill, 1878	45 57 34.222	1056.6	265 33 58.1	85 36 27.9	Martins Bluff	4501.7	3.653381
	122 52 05.122	110.3	289 17 23.1	109 22 13.0	Burnt Hill	9207.9	3.964162
			333 32 27.4	153 33 57.0	Maple Hill	6030.1	3.780321
Burnt Hill, 1878	45 55 55.504	1713.7	331 07 42.1	151 09 17.8	Lewis River Hills	5951.6	3.774631
	122 45 21.726	468.1	356 53 22.0	176 53 54.0	Fales	17801.9	4.250467
			35 21 22.2	215 18 52.3	Table Cliff	7777.7	3.890850
Maple Hill, 1878	45 54 39.354	1215.0	197 25 52.9	17 26 53.1	Martins Bluff	6022.2	3.779757
	122 50 00.463	10.0	248 35 42.5	68 39 02.8	Burnt Hill	6450.2	3.809570
			287 48 55.8	107 53 51.8	Lewis River Hills	9331.5	3.969951
Lewis River Hills, 1878	45 53 06.677	206.1	14 04 12.3	194 03 22.0	Reed	6224.2	3.794082
	122 43 08.454	182.3	81 18 13.3	261 14 07.8	Table Cliff	7460.6	3.872774
Reed, 1878	45 49 51.122	1578.4	3 29 49.6	183 29 36.4	Fales	6537.8	3.815435
	122 44 18.560	400.6	38 21 29.8	218 15 34.1	Bouser	17302.7	4.238113
			57 25 44.3	237 19 04.9	Scappoose	14285.7	4.154901
Table Cliff, 1878	45 52 29.999	926.2	309 52 46.2	129 56 01.3	Reed	7646.0	3.883436
	122 48 50.409	1087.1	334 24 10.6	154 27 12.4	Fales	12672.2	4.102852
			14 43 34.4	194 40 53.5	Bouser	19108.0	4.281216
			26 03 38.1	206 00 13.6	Scappoose	14031.0	4.147088
Scappoose, 1878	45 45 41.648	1285.8	298 54 26.7	119 02 43.1	Secrist	17136.5	4.233923
	122 53 35.646	770.4	335 59 43.2	156 03 58.4	Willamet	18992.7	4.278586
			347 24 16.3	167 24 59.8	Bouser	6019.5	3.779560
Fales, 1878	45 46 19.758	610.0	12 01 18.2	191 59 07.9	Willamet	18945.7	4.277510
	122 44 37.017	799.8	55 44 10.3	235 38 28.0	Bouser	12509.3	4.097233
			84 16 51.9	264 10 25.9	Scappoose	11698.3	4.068121
Secrist, 1881	45 41 12.753	393.7	2 02 43.4	186 02 23.1	Balch	17243.6	4.236628
	122 42 02.400	51.9	38 52 54.6	218 48 53.8	Willamet	11624.2	4.065363
Bouser, 1878	45 42 31.365	968.3	279 59 36.5	100 07 09.2	Secrist	13999.1	4.142986
	122 52 34.962	756.2	330 48 38.2	150 52 09.8	Willamet	13146.2	4.118799
Willamet, 1881	45 36 19.521	602.7	261 20 00.8	81 26 59.2	Harney	12832.3	4.108305
	122 47 39.108	847.5	320 42 18.7	140 45 58.9	Balch	10564.8	4.023861

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Harney, 1881	45 37 21.734	671.0	328 15 53.08	148 18 43.96	Rocky Butte	9866.53	3.9941643
	122 37 53.538	1159.9	40 59 24.33	220 54 19.74	Barnes	14110.22	4.1495337
Warren, 1903	45 48 33.229	1025.9	225 52 07.84	46 03 54.50	Davis	29504.23	4.4698843
	122 52 08.679	187.4	296 26 15.40	116 59 49.58	Larch	68230.27	4.8339771
			343 29 22.08	163 34 28.69	Barnes	32731.73	4.5149689
Barnes, 1903	45 31 36.526	1127.6	357 18 16.35	177 19 51.87	Hult	62686.70	4.7971754
	122 45 00.031	0.7	30 59 06.87	210 42 21.69	Yam	60103.71	4.7789013
Rocky Butte, 1899	45 32 49.861	1539.3	81 09 27.93	261 01 32.80	Barnes	14620.66	4.1649670
	122 33 54.303	1177.8	140 59 23.21	320 46 20.26	Warren	37539.95	4.5744937
			177 15 37.04	357 14 17.96	Davis	49689.84	4.6962679
Fir, 1903	45 31 23.055	711.8	295 11 01.5	115 11 39.9	Cem	1293.0	3.111594
	122 44 46.238	1003.6	8 09 29.8	188 09 23.5	Hill	1343.7	3.128313
Monument, General Land Survey, 1903.	45 31 11.933	368.4	23 58 29.5	203 58 15.0	Hill	1079.9	3.033393
	122 44 34.806	755.4	144 09 14.0	324 09 05.8	Fir	423.6	2.626968
Hill, 1903	45 30 39.970	1234.0	176 26 18.0	356 26 14.4	Barnes	1749.4	3.242892
	122 44 55.023	1194.3	240 10 43.2	60 11 27.9	Cem	1568.4	3.195468
Cem, 1903	45 31 05.230	161.5	123 20 05.0	303 19 16.7	Barnes	1758.5	3.245153
	122 43 52.328	1135.8	198 44 43.5	18 45 53.8	River	6640.3	3.822185
River, 1903	45 34 28.89	891.9	285 42 28.7	105 48 25.4	Rocky Butte	11258.5	4.0514797
	122 42 13.91	301.6	34 07 13.5	214 05 14.9	Barnes	6426.7	3.8079902
Oregonian, 1903	45 31 13.21	407.8	161 11 03.4	341 09 55.6	River	6382.8	3.8050088
	122 40 38.97	845.8	251 11 25.6	71 16 14.4	Rocky Butte	9273.7	3.9672517
Portland longitude station, 1887	45 31 08.82	272.3					
	122 40 39.75	862.7					
Portland latitude station, 1887	45 31 08.83	272.6	187 56 52	7 56 53	Oregonian	136.6	2.13537
	122 40 39.84	864.5					
Portland bench mark (U. S. G. S.)	45 31 09.07	280.0			Oregonian	128.7	2.10969
	122 40 39.77	863.1					
Balch, 1881	45 31 54.574	1684.8	80 15 16.28	260 13 29.77	Barnes	3286.69	3.5167584
	122 42 30.763	667.4	210 43 44.61	30 47 02.60	Harney	11753.53	4.0701684
			261 17 15.30	81 23 23.91	Rocky Butte	11334.39	4.0543981
S. (U. S. E.), 1913	46 15 23.539	726.8	31 52 36.3	211 50 42.1	Gun (U. S. E.)	6419.2	3.807480
	123 55 02.654	56.8	96 39 10.5	276 37 03.8	Island (U. S. E.)	3781.6	3.577677
Baker (new), 1913	46 17 37.805	1167.3	316 33 08.8	136 35 21.2	S. (U. S. E.)	5708.6	3.756527
	123 58 05.940	127.2	357 23 11.0	177 23 16.7	Island (U. S. E.)	3712.6	3.569677
H. (U. S. E.), 1913	46 16 03.574	110.3	228 02 50.6	48 04 39.9	Baker (new)	4353.5	3.638843
	124 00 37.203	796.7	279 45 18.6	99 49 20.3	S. (U. S. E.)	7270.8	3.861580
			330 30 28.6	150 32 36.1	Gun (U. S. E.)	7682.5	3.885501
			116 38 11.0	296 36 42.7	East Battery	2930.4	3.466933
I (U. S. E.), 1913	46 17 21.098	651.4	262 50 10.3	82 52 29.3	Baker (new)	4147.8	3.617822
	124 01 18.213	389.9	339 51 11.6	159 51 41.3	H (U. S. E.)	2549.6	3.406475
			58 11 22.2	238 10 23.6	East Battery	2049.3	3.311600
Wallicut (U. S. E.), 1913	46 18 41.990	1296.5	321 13 22.4	141 14 16.2	Baker (new)	2541.8	3.405149
	123 59 20.314	434.8	45 18 11.8	225 16 46.6	I (U. S. E.)	3550.4	3.550272
Bluff (U. S. E.), 1913	46 18 28.384	876.4	262 23 09.3	82 24 55.7	Wallicut (U. S. E.)	3176.7	3.501983
	124 01 47.471	1015.8	343 13 26.9	163 13 48.1	I (U. S. E.)	2169.9	3.336437
Point (U. S. E.), 1913	46 17 47.159	1456.1	227 51 05.8	47 51 53.3	Bluff (U. S. E.)	1897.1	3.278093
	124 02 53.201	1138.9	291 34 57.5	111 36 06.2	I (U. S. E.)	2196.6	3.339772
			351 11 20.3	171 11 30.4	East Battery	1907.6	3.280492
Chinook (U. S. E.), 1913	46 16 50.516	1559.8	100 30 45.8	280 27 53.6	I (U. S. E.)	5187.0	3.714915
	123 57 19.965	427.6	143 12 06.8	323 10 39.8	Wallicut (U. S. E.)	4299.1	3.633374
Sands, 1913	46 12 35.471	1095.2	300 18 05.5	120 20 19.9	St. Marys Hospital	4622.9	3.664912
	123 52 36.355	779.4	106 25 47.9	286 22 26.6	Desdemona Sands Lighthouse	6232.6	3.794669
Point Ellice (U. S. E.), 1913	46 14 31.104	960.4	328 41 03.3	148 43 04.2	St. Marys Hospital	6909.7	3.839457
	123 52 17.703	379.3	6 23 23.4	186 23 09.9	Sands	3592.6	3.555411
			74 10 50.6	254 07 15.7	Desdemona Sands Lighthouse	6628.9	3.821440
Point Ellice (U. S. E.) reference mark No. 1,[1] 1913.	46 14 31.288	966.0	71 31 11	251 31 10	Point Ellice (U. S. E.)	17.925	1.25346
	123 52 16.909	362.3					
Point Ellice (U. S. E.) reference mark No. 2,[1] 1913.	46 14 31.742	980.1	8 43 10	188 43 10	Point Ellice (U. S. E.)	19.93	1.29951
	123 52 17.562	376.3					
Harrington (U. S. E.), 1913	46 16 03.367	104.0	338 24 13.6	158 25 32.9	Water	6398.3	3.806066
	123 40 04.735	101.4	49 03 33.4	228 59 39.0	Tongue (U. S. E.)	9209.3	3.964226
			95 08 32.9	275 04 08.3	Grays (U. S. E.)	7872.0	3.896085
Harrington (U. S. E.) reference mark,[1] 1913.	46 16 02.897	89.4	123 10 43	303 10 43	Harrington (U. S. E.)	26.5	1.42325
	123 40 03.699	79.2					

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Taylor, 1913	46 13 31.917	985.5	36 53 48.4	216 52 05.4	St. Marys Hospital	5096.6	3.707280
	123 47 07.551	161.8	105 24 23.8	285 20 39.8	Point Ellice (U. S. E.)	6892.5	3.838374
Grays (U. S. E.), 1913	46 16 26.056	804.5	12 43 23.9	192 42 43.0	Taylor	5512.0	3.741311
	123 46 10.903	233.5	24 20 06.1	204 17 42.2	St. Marys Hospital	10373.6	4.015929
			65 43 26.0	245 39 01.0	Point Ellice (U. S. E.)	8620.7	3.935542
Tongue (U. S. E.), 1913	46 12 47.794	1475.7	110 03 54.0	289 58 59.0	Point Ellice (U. S. E.)	9315.8	3.969218
	123 45 29.272	627.4	122 54 11.8	302 53 00.8	Taylor	2508.6	3.399426
			172 27 55.0	352 27 24.9	Grays (U. S. E.)	6797.9	3.832375
Tongue (U. S. E.) reference mark, 1913.	46 12 47.430	1464.4	206 30 24	26 30 24	Tongue (U. S. E.)	12.57	1.09934
	123 45 29.534	633.1					
Water, 1913	46 12 50.676	1564.7	89 29 45.5	269 24 31.9	Tongue (U. S. E.)	9312.0	3.969042
	123 38 14.869	318.7	123 09 19.9	303 03 36.1	Grays (U. S. E.)	12175.0	4.085468
Rocky Point 2, 1913	46 15 38.408	1185.9	21 01 00.1	200 59 53.0	Water	5547.7	3.744112
	123 36 42.048	900.5	65 03 05.1	244 56 44.3	Tongue (U. S. E.)	12464.4	4.095670
			96 56 36.5	276 49 45.4	Grays (U. S. E.)	12270.2	4.088852
Rocky Point 2 reference mark,[1] 1913	46 15 38.886	1200.7	38 31 20	218 31 20	Rocky Point 2	18.87	1.27577
	123 36 41.499	888.8					
Wharf, 1913	46 13 40.309	1244.6	65 40 55.4	245 39 01.1	Water	3719.1	3.570440
	123 35 36.758	787.7	159 01 13.4	339 00 26.2	Rocky Point 2	3905.6	3.591683
			130 39 27	310 39 27	Jim Crow Point	2.20	0.34242
Jim Crow (U. S. E.), 1913	46 15 39.885	1231.5	32 08 59.2	212 07 41.0	Wharf	4360.2	3.639510
	123 33 48.486	1038.4	47 53 22.8	227 30 10.3	Water	7737.7	3.888610
			89 18 52.8	269 16 47.4	Rocky Point 2	3717.4	3.570244
Raspberry (U. S. E.), 1913	46 14 08.773	270.9	81 58 31.4	261 55 02.0	Wharf	6273.0	3.797478
	123 30 46.898	1004.9	125 53 34.4	305 51 23.2	Jim Crow (U. S. E.)	4800.6	3.681295
Three Tree Point (U. S. E.), 1913	46 16 03.406	105.2	352 08 21.9	172 08 38.4	Raspberry (U. S. E.)	3573.0	3.553035
	123 31 09.704	207.8	52 20 49.4	232 17 36.5	Wharf	7228.4	3.859041
			77 57 36.1	257 55 41.4	Jim Crow (U. S. E.)	3477.1	3.541216
			160 04 51	340 04 51	Three Tree Point	8.77	0.94300
Lower Skumaquea Light, June, 1913	46 16 04.654	143.7	48 12 08.6	228 09 53.7	Raspberry (U. S. E.)	5366.4	3.729680
	123 27 40.184	860.5	89 31 44.3	269 29 12.9	Three Tree Point (U. S. E.)	4486.9	3.651942
Ten, 1913	46 14 39.622	1223.4	78 37 55.8	258 35 16.4	Raspberry (U. S. E.)	4823.1	3.683328
	123 27 06.215	133.1	116 24 27.7	296 21 31.8	Three Tree Point (U. S. E.)	5821.6	3.765043
			164 30 51.3	344 30 26.8	Lower Skumaquea Light	2724.5	3.435279
Ten reference mark [1]	46 14 39.638	1223.9	296 24 28	116 24 28	Ten	1.1	0.04139
	123 27 06.261	134.1					
Stump, 1913	46 15 24.775	765.0	15 21 00.0	195 20 47.1	Ten	1445.7	3.160085
	123 26 48.351	1035.6	137 58 11.8	317 57 34.4	Lower Skumaquea Light	1657.8	3.219545
Dike, 1913	46 13 43.013	1346.6	127 14 22.2	307 13 05.5	Ten	2858.5	3.456131
	123 25 19.992	428.4	145 25 24.4	325 23 43.2	Lower Skumaquea Light	5290.0	3.723454
			148 47 27.9	328 46 24.1	Stump	3652.4	3.562575
Dike reference mark,[1] 1913	46 13 44.053	1360.2	67 06 22	247 06 21	Dike	34.94	1.54332
	123 25 18.490	396.2					
Mud, 1913	46 13 46.094	1423.2	162 47 50.7	342 47 18.9	Stump	3189.7	3.503745
	123 26 04.307	92.3	274 36 28.4	94 37 00.4	Dike	952.7	2.978969
Tree, 1913	46 07 09.447	291.7	116 05 15.6	296 03 33.7	Rinearson	3379.5	3.528855
	123 00 09.454	203.0	225 47 41.7	45 48 21.9	Mount Coffin	1669.9	3.222694
Barlow, 1913	46 08 42.274	1305.4	324 55 42.6	144 56 50.1	Tree	3501.5	3.544260
	123 01 43.157	926.2	36 33 21.6	216 32 47.2	Rinearson	1718.8	3.235222
Barlow reference mark, No. 1,[1] 1913	46 08 43.731	1350.2	319 02 58	139 02 59	Barlow	59.58	1.77510
	123 01 44.976	965.3					
Barlow reference mark, No. 2,[1] 1913	46 08 44.046	1360.0	345 50 54	165 50 54	Barlow	56.435	1.75155
	123 01 43.800	940.1					
Quarry (U. S. E.), 1913	46 07 42.832	1322.5	46 46 25.9	226 45 49.1	Tree	1504.9	3.177522
	122 59 18.383	394.6	96 17 52.0	276 15 33.3	Rinearson	4156.6	3.618742
Slaughter 2 (U. S. E.), 1913	46 07 06.669	205.9	91 55 49.3	271 54 23.4	Tree	2561.9	3.408555
	122 58 10.209	219.1	105 42 34.3	285 39 26.5	Rinearson	5812.1	3.764333
			122 52 23.1	302 49 49.7	Barlow	5441.6	3.735726
			127 20 41.1	307 19 52.0	Quarry (U. S. E.)	1841.0	3.265045
			132 31 46.4	312 31 00.7	Mount Coffin	1849.4	3.267020
Slaughter 2 (U. S. E.) reference mark, No. 1,[1] 1913.	46 07 10.164	313.8	350 46 53	170 46 54	Slaughter 2 (U. S. E.)	109.32	2.03870
	122 58 11.025	236.7					
Slaughter 2 (U. S. E.) reference mark, No. 2,[1] 1913.	46 07 08.272	255.4	40 42 05	220 42 04	Slaughter 2 (U. S. E.)	65.30	1.81491
	122 58 08.226	176.6					
Curve (U. S. E.), 1912	46 06 34.724	1072.1	176 56 19.7	356 56 15.9	Quarry (U. S. E.)	2105.9	3.323442
	122 59 13.144	282.3	233 52 13.4	53 52 58.7	Slaughter 2 (U. S. E.)	1673.1	3.223526

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″	′	*Meters.*	
Tangent (U. S. E.), 1912	46 06 06.453	199.2	122 37 50.0	302 37 04.3	Curve (U. S. E.)	1619.1	3.209273
	122 58 09.651	207.3	179 37 51.2	359 37 50.8	Slaughter 2 (U. S. E.)	1859.3	3.269345
Beach 2 (U. S. E.), 1912	46 06 39.452	1218.1	36 20 19.7	216 19 54.6	Tangent (U. S. E.)	1264.8	3.102024
	122 57 34.757	746.4	137 49 49.3	317 49 23.8	Slaughter 2 (U. S. E.)	1133.9	3.054577
Bourne (U. S. E.), 1912	46 05 50.121	1547.5	122 25 37.9	302 25 11.3	Tangent (U. S. E.)	940.5	2.973349
	122 57 32.632	702.2	178 19 55.3	358 19 53.8	Beach 2 (U. S. E.)	1523.8	3.182924
A 2 (U. S. E.), 1912	46 06 22.442	692.9	28 43 32.0	208 43 13.6	Bourne (U. S. E.)	1138.0	3.056126
	122 57 07.231	155.3	69 47 26.3	249 46 41.3	Tangent (U. S. E.)	1428.7	3.154930
Hut (U. S. E.), 1912	46 06 09.338	288.3	62 59 11.2	242 58 32.2	Bourne (U. S. E.)	1308.1	3.115972
	122 56 38.523	827.5	123 16 32.6	303 16 12.0	A 2 (U. S. E.)	737.5	2.867754
Mill (U. S. E.), 1912	46 05 37.624	1161.7	114 38 17.6	294 37 49.4	Bourne (U. S. E.)	925.7	2.966457
	122 56 53.522	1149.8	198 12 42.4	18 12 53.2	Hut (U. S. E.)	1030.8	3.013185
Wood 2 (U. S. E.), 1912	46 05 59.851	1847.9	51 39 54.7	231 39 25.6	Mill (U. S. E.)	1106.3	3.043875
	122 56 13.126	281.9	118 14 16.2	298 13 57.9	Hut (U.S. E.)	619.2	2.791811
Dock (U. S. E.), 1912	46 05 35.092	1083.5	170 14 04.9	350 13 58.8	Hut (U. S. E.)	1072.9	3.030570
	122 56 30.050	645.6	205 25 55.6	25 26 07.8	Wood 2 (U. S. E.)	846.5	2.927624
Net 2 (U. S. E.), 1912	46 05 55.825	1723.6	54 13 08.6	234 12 38.8	Dock (U. S. E.)	1094.7	3.039313
	122 55 48.708	1046.2	103 20 07.3	283 19 49.7	Wood 2 (U. S. E.)	539.0	2.731610
Ranier 2 (U. S. E.), 1912	46 05 23.782	734.3	159 23 49.7	339 23 35.7	Wood 2 (U. S. E.)	1189.8	3.075458
	122 55 53.635	1152.3	186 06 21.4	6 06 25.0	Net 2 (U. S. E.)	995.0	2.997818
Bluff (U. S. E.), 1912	46 05 12.591	388.8	112 07 43.8	292 07 16.3	Ranier 2 (U. S. E.)	917.5	2.962587
	122 55 14.075	302.4	150 52 14.7	330 51 49.8	Net 2 (U. S. E.)	1528.2	3.184185
Cowlitz 2 (U. S. E.), 1912	46 000 0.078	2.4	23 54 49.3	203 54 27.5	Bluff (U. S. E.)	1603.9	3.205165
	122 54 43.814	941.1	84 37 27.6	264 36 40.9	Net 2 (U. S. E.)	1400.1	3.146148
D 10 (U. S. E.), 1912	46 05 08.188	252.8	93 32 42.4	273 31 28.6	Bluff (U. S. E.)	2204.9	3.343388
	122 53 31.644	679.9	135 56 53.8	315 56 01.8	Cowlitz 2 (U. S. E.)	2229.5	3.348202
D 9 (U. S. E.), 1912	46 04 45.917	1417.7	167 06 09.6	347 05 52.0	Cowlitz 2 (U. S. E.)	2349.1	3.370897
	122 54 19.403	416.9	236 10 08.9	56 10 43.3	D 10 (U. S. E.)	1235.3	3.091758
D 8 (U. S. E.), 1912	46 04 42.860	1323.3	93 34 55.6	273 34 05.0	D 9 (U. S. E.)	1513.6	3.180025
	122 53 09.098	195.5	148 13 30.7	328 13 14.5	D 10 (U. S. E.)	919.9	2.963748
D 7 (U. S. E.), 1912	46 04 23.417	723.0	199 12 01.5	19 12 17.7	D 10 (U. S. E.)	1463.8	3.165479
	122 53 54.051	1161.6	238 08 09.9	58 08 42.3	D 8 (U. S. E.)	1137.3	3.055885
D 6 (U. S. E.), 1912	46 04 13.175	406.8	102 00 31.1	281 59 41.2	D 7 (U. S. E.)	1520.7	3.182035
	122 52 44.837	963.5	150 22 11.7	330 21 54.2	D 8 (U. S. E.)	1054.4	3.023020
D 5 (U. S. E.), 1912	46 03 52.049	1607.0	199 51 11.7	19 51 30.7	D 8 (U. S. E.)	1668.0	3.222186
	122 53 35.460	762.1	239 03 05.4	59 03 41.9	D 6 (U. S. E.)	1268.5	3.103302
D 4 (U. S. E.), 1912	46 03 08.083	249.6	125 23 34.6	305 22 30.6	D 5 (U. S. E.)	2344.3	3.370012
	122 52 06.546	140.7	157 43 58.2	337 43 30.7	D 6 (U. S. E.)	2171.8	3.336810
D 3 (U. S. E.), 1912	46 02 54.549	1684.2	189 53 22.7	9 53 36.9	D 6 (U. S. E.)	2464.2	3.391681
	122 53 04.532	97.4	251 27 48.7	71 28 30.4	D 4 (U. S. E.)	1314.8	3.118854
D 1 (U. S. E.), 1912	46 02 18.043	557.1	167 25 02.7	347 24 54.3	D 3 (U. S. E.)	1154.9	3.062541
	122 52 52.830	1136.0	212 46 50.5	32 47 23.8	D 4 (U. S. E.)	1837.7	3.264286
D 2 (U. S. E.), 1912	46 02 26.711	824.7	65 25 04.7	245 24 45.1	D 1 (U. S. E.)	643.3	2.808396
	122 52 25.626	551.0	135 46 52.3	315 46 24.3	D 3 (U. S. E.)	1199.4	3.078959
Kalama (U. S. E.), 1912	46 02 13.622	420.6	100 56 13.6	280 55 49.9	D 1 (U. S. E.)	719.6	2.857092
	122 52 19.974	429.5	163 15 33.5	343 15 29.4	D 2 (U. S. E.)	422.0	2.625316
Coffin Rock (U. S. E.), 1912	46 02 03.873	119.6	167 46 27.0	347 46 23.8	D 1 (U. S. E.)	447.6	2.650931
	122 52 48.422	1041.3	243 47 57.0	63 48 17.5	Kalama (U. S. E.)	681.8	2.833659
H 27 (U. S. E.), 1912	46 01 43.734	1350.3	122 27 31.4	302 26 58.7	Coffin Rock (U. S. E.)	1158.7	3.063986
	122 52 02.957	63.6	158 22 13.1	338 22 00.9	Kalama (U. S. E.)	992.7	2.996827
H 30_2 (U. S. E.), 1912	46 01 09.920	306.3	68 15 14.3	248 15 12.4	Knight	61.6	1.789845
	122 52 28.212	606.9	165 22 40.4	345 22 25.9	Coffin Rock (U. S. E.)	1721.6	3.235930
			207 29 10.7	27 29 28.9	H 27 (U. S. E.)	1176.9	3.070731
			302 58 48.6	123 00 07.0	Kalama	2794.0	3.446224
			357 14 58.7	177 15 00.4	H 28 (U. S. E.)	1103.0	3.042576
Mill (U. S. E.), 1912	46 01 22.971	709.2	30 38 04.3	210 37 34.4	H 28 (U. S. E.)	1748.7	3.242709
	122 51 44.336	953.7	66 53 03.1	246 52 31.5	H 30_2 (U. S. E.)	1026.2	3.011233
			66 57 44.2	246 57 10.7	Knight	1087.8	3.036559
			148 00 24.8	328 00 11.4	H 27 (U. S. E.)	755.9	2.878454
			323 57 57.5	143 58 44.3	Kalama	2379.4	3.376467
			330 48 55.6	150 49 47.8	H 23_2 (U. S. E.)	3204.3	3.505738
H 28 (U. S. E.), 1912	46 00 34.237	1057.1	297 46 45.3	117 48 07.3	H 23_2 (U. S. E.)	2773.4	3.443011
	122 52 25.751	554.0	332 06 03.4	152 06 46.1	Slue	2733.3	3.436694
Bank, 1913	46 01 42.453	1310.7	28 57 02.9	208 56 43.9	Knight	1174.0	3.069662
	122 52 04.455	95.8	147 20 34.9	327 19 53.6	Carr	2287.7	3.359398

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Bank reference mark,[1] 1913	46 01 42.509 122 52 02.923	1312.5 62.9	86 58 21	266 58 20	Bank	33.0	1.51851
Cable, 1913	46 02 21.121 122 52 28.760	652.1 618.5	336 21 14.7 1 10 21.0 135 48 02.2	156 21 32.2 181 10 19.5 315 47 38.4	Bank Knight Carr	1303.3 2221.7 1021.1	3.115042 3.346678 3.009083
Dock, 1913	46 03 12.334 122 53 08.892	380.8 191.1	331 22 28.8 349 55 05.8 155 01 49.7	151 22 57.7 169 55 10.9 335 01 30.6	Cable Carr D 5 (U. S. E.)	1801.3 862.5 1352.7	3.255591 2.935757 3.131195
Rail, 1913	46 04 09.421 122 52 04.214	290.9 90.6	8 58 12.5 25 23 30.6 38 16 15.3	188 57 54.8 205 22 49.1 218 15 28.7	Cable Carr Dock	3385.2 2890.9 2244.9	3.529582 3.461036 3.351193
Cotton, 1913	46 04 15.526 122 52 47.366	479.4 1018.0	281 29 06.5 353 32 16.4 6 21 16.5 13 20 35.8 54 57 48.3	101 29 37.6 173 32 29.8 186 21 06.1 193 20 20.3 234 57 13.7	Rail Cable Carr Dock D 5 (U. S. E.)	946.3 3554.9 2817.6 2005.2 1262.5	2.976051 3.550824 3.449876 3.302159 3.101222
Cotton reference mark No. 1,[1] 1913	46 04 15.525 122 52 46.435	479.3 997.9	90 02 46	270 02 45	Cotton	20.0	1.30103
Cotton reference mark No. 2,[1] 1913	46 04 15.525 122 52 45.039	479.3 967.9	90 02 46	270 02 45	Cotton	50.0	1.69897
Cut, 1913	46 04 03.863 122 53 41.521	119.3 892.4	252 48 10.5 265 17 58.5 336 12 27.3	72 48 49.5 85 19 08.6 156 12 50.8	Cotton Rail Dock	1218.3 2098.3 1738.7	3.085758 3.321875 3.240231
Cut reference mark,[1] 1913	46 04 03.979 122 53 40.980	122.9 880.7	72 48 10	252 48 10	Cut	12.17	1.08529
Cottonwood Island, 1913	46 04 43.040 122 53 10.718	1328.9 230.3	329 25 37.2 359 11 50.8 28 41 36.6	149 25 54.0 179 11 52.1 208 41 14.4	Cotton Dock Cut	986.6 2800.9 1378.9	2.994162 3.447293 3.139531
Cottonwood Island reference mark No. 1,[1] 1913.	46 04 43.538 122 53 09.519	1344.3 204.5	59 10 56	239 10 55	Cottonwood Island	30.0	1.47712
Cottonwood Island reference mark No. 2,[1] 1913.	46 04 44.036 122 53 08.320	1359.6 178.8	59 10 57	239 10 55	Cottonwood Island	60.0	1.77815
Old, 1913	46 04 43.324 122 54 15.755	1337.6 338.5	270 21 10.7 294 18 27.3	90 21 57.6 114 19 31.0	Cottonwood Island Cotton	1397.5 2084.3	3.145363 3.318965
Knight, 1913	46 01 09.180 122 52 30.873	283.4 664.1	167 16 59.7 203 04 42.4	347 16 37.4 23 05 21.8	Carr Drays Mound	3027.5 3004.2	3.481088 3.477728
Knight reference mark No. 1,[1] 1913	46 01 08.591 122 52 30.893	265.2 664.6	181 22 23	1 22 23	Knight	18.2	1.26007
Knight reference mark No. 2,[1] 1913	46 01 09.313 122 52 30.730	287.5 661.0	36 53 19	216 53 19	Knight	5.14	0.71096
Kalama, 1913	46 00 20.646 122 50 39.281	637.4 845.2	121 58 59.2 145 27 03.0 164 00 19.6	301 57 38.9 325 25 20.4 343 59 38.7	Knight Carr Drays Mound	2830.0 5405.9 4433.9	3.451791 3.732867 3.646789
Kalama reference mark[1], 1913	46 00 19.945 122 50 38.919	615.8 837.4	160 13 24	340 13 24	Kalama	22.99	1.36154
Slue, 1913	45 59 15.993 122 51 26.328	493.8 566.7	158 20 00.1 178 04 35.5 206 53 20.4	338 19 13.7 358 04 28.6 26 53 54.3	Knight Drays Mound Kalama	3760.5 6261.9 2238.2	3.575250 3.796704 3.349908
Slue reference mark No. 1,[1] 1913	45 59 14.496 122 51 28.106	447.6 604.9	219 36 49	39 36 50	Slue	60.0	1.77815
Slue reference mark No. 2,[1] 1913	45 59 15.245 122 51 27.217	470.7 585.8	219 36 49	39 36 50	Slue	30.0	1.47712
H 26_2 (U. S. E.), 1912	45 59 15.652 122 51 24.978	483.3 537.6	109 55 21	289 55 20	Slue	30.90	1.48996
Rock, 1913	45 59 43.290 122 50 22.257	1336.6 479.0	58 34 21.9 162 22 54.0	238 33 35.8 342 22 41.8	Slue Kalama	1616.1 1210.1	3.208462 3.082838
Rock reference mark, No. 1,[1] 1913	45 59 43.588 122 50 22.853	1345.8 491.8	305 40 35	125 40 35	Rock	15.8	1.19866
Rock reference mark, No. 2, [1] 1913	45 59 42.841 122 50 22.914	1322.7 493.1	225 33 42	45 33 42	Rock	19.8	1.29667
Flat, 1913	45 58 45.361 122 50 30.143	1400.5 648.9	128 01 56.9 176 10 36.1 185 25 12.7	308 01 16.5 356 10 29.6 5 25 18.4	Slue Kalama Rock	1535.3 2948.5 1796.6	3.186185 3.469603 3.254454
Flat reference mark, No. 1,[1] 1913	45 58 44.896 122 50 30.855	1386.2 664.2	226 51 21	46 51 21	Flat	21.00	1.32222

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Flat reference mark, No. 2,[1] 1913	45 58 44.561 122 50 31.367	1375.8 675.2	226 51 22	46 51 21	Flat	36.10	1.55751
H 21 (U. S. E.), 1912	45 59 19.566 122 50 05.616	604.1 120.9	26 33 43.3 86 22 27.3 153 56 47.4	206 33 25.6 266 21 29.2 333 56 35.4	Flat Slue Rock	1180.7 1740.6 815.3	3.072137 3.240710 2.911340
H 21 (U. S. E.) reference mark,[1] 1913	45 59 18.917 122 50 04.718	584.1 101.5	136 01 33	316 01 32	H 21 (U. S. E.)	27.83	1.44451
H 23_2 (U. S. E.), 1912	45 59 52.356 122 50 31.724	1616.5 682.6	330 58 02.9 359 03 25.1 46 18 43.1 169 27 22.9	150 58 21.7 179 03 26.2 226 18 03.8 349 27 17.5	H 21 (U. S. E.) Flat Slue Kalama	1157.9 2068.8 1625.2 888.5	3.063657 3.315712 3.210918 2.948637
H 23_2 (U. S. E.) reference mark,[1] 1913	45 59 52.432 122 50 30.839	1618.8 663.6	82 55 42	262 55 41	H 23_2 (U. S. E.)	19.18	1.28285
H 22 (U. S. E.), 1912	45 58 14.588 122 49 53.515	450.4 1152.2	140 18 46.2 172 36 08.4	320 18 19.8 352 35 59.7	Flat H 21 (U. S. E.)	1234.7 2023.1	3.091571 3.306009
H 22 (U. S. E.) reference mark,[1] 1913	45 58 14.175 122 49 54.514	437.6 1173.8	239 20 09	59 20 10	H 22 (U. S. E.)	25.0	1.39794
H 19 (U. S. E.), 1912	45 58 26.590 122 49 26.614	821.0 572.9	57 23 14.1 152 50 01.6	237 22 54.8 332 49 33.6	H 22 (U. S. E.) H 21 (U. S. E.)	687.5 1838.5	2.837288 3.264467
H 19 (U. S. E.) reference mark,[1] 1913	45 58 26.462 122 49 25.692	817.0 553.1	101 16 05	281 16 04	H 19 (U. S. E.)	20.25	1.30642
Hill (U. S. E.), 1912	45 58 07.963 122 48 57.032	245.9 1227.9	99 33 14.7 132 05 10.1 327 46 49.5	279 32 34.1 312 04 48.8 147 47 04.1	H 22 (U. S. E.) H 19 (U. S. E.) Martins Bluff	1233.1 858.1 821.9	3.091004 2.933552 2.914806
Hill (U. S. E.) reference mark,[1] 1913	45 58 08.246 122 48 57.442	254.6 1236.7	314 38 11	134 38 11	Hill (U. S. E.)	12.42	1.09412
H 20 (U. S. E.), 1912	45 57 42.247 122 49 47.817	1304.4 1029.7	172 59 53.1 198 26 18.1 234 00 42.4 266 18 29.9	352 59 49.0 18 26 33.3 54 01 18.9 86 19 21.0	H 22 (U. S. E.) H 19 (U. S. E.) Hill (U. S. E.) Martins Bluff	1006.0 1443.2 1351.3 1534.9	3.002606 3.159326 3.130761 3.186084
H 20 (U. S. E.) reference mark,[1] 1913	45 57 42.776 122 49 47.564	1320.7 1024.2	18 26 18	198 26 18	H 20 (U. S. E.)	17.22	1.23603
Connel 2 (U. S. E.), 1912	45 56 59.120 122 49 17.342	1825.3 373.5	153 45 57.7 191 37 30.5 211 28 21.7	333 45 35.8 11 37 45.1 31 28 50.9	H 20 (U. S. E.) Hill (U. S. E.) Martins Bluff	1484.5 2170.1 1677.0	3.171583 3.336473 3.224524
Connel 2 (U. S. E.) reference mark,[1] 1913	45 56 59.837 122 49 19.282	1847.4 415.3	297 54 36	117 54 37	Connel 2 (U. S. E.)	47.27	1.67459
Martin 3 (U. S. E.), 1912	45 56 47.850 122 48 10.923	1477.4 235.3	103 40 30.4 158 07 54.0 162 40 29.8	283 39 42.7 338 07 20.8 342 40 11.3	Connel 2 (U. S. E.) Hill (U. S. E.) Martins Bluff	1472.3 2665.3 1862.6	3.167989 3.425748 3.270129
Martin 3 (U. S. E.) reference mark,[1] 1913	45 56 47.863 122 48 10.165	1477.7 218.9	88 36 44	268 36 44	Martin 3 (U. S. E.)	16.33	1.21299
H 16_2 (U. S. E.), 1912	45 55 45.844 122 49 05.836	1415.3 125.7	173 45 53.4 211 42 26.0	353 44 45.2 31 43 05.5	Connel 2 (U. S. E.) Martin 3 (U. S. E.)	2275.9 2250.4	3.357145 3.352262
H 13_3 (U. S. E.), 1912	45 55 36.925 122 47 47.471	1400.6 1022.8	99 16 13.0 142 40 04.7 167 00 35.4	279 15 16.7 322 39 00.2 347 00 18.6	H 16_2 (U. S. E.) Connel 2 (U. S. E.) Martin 3 (U. S. E.)	1710.8 3191.9 2247.3	3.233198 3.504048 3.351663
H 13_3 (U. S. E.) reference mark,[1] 1913	45 55 36.218 122 47 46.850	1118.2 1009.4	148 29 58	328 29 58	H 13_3 (U. S. E.)	25.6	1.40824
H 11 (U. S. E.), 1912	45 54 57.741 122 48 05.196	1782.8 112.0	138 39 43.2 197 31 11.9	318 38 59.6 17 31 24.6	H 16_2 (U. S. E.) H 13_3 (U. S. E.)	1978.2 1268.6	3.296260 3.103327
H 11 (U. S. E.) reference mark,[1] 1913	45 54 56.978 122 48 03.684	1759.1 79.4	125 51 58	305 51 57	H 11 (U. S. E.)	40.2	1.60423
H 14_2 (U. S. E.), 1912	45 54 35.794 122 49 00.246	1105.1 5.3	176 48 40.5 219 43 02.7 240 15 47.1	356 48 36.5 39 43 55.0 60 16 26.7	H 16_2 (U. S. E.) H 13_3 (U. S. E.) H 11 (U. S. E.)	2166.1 2453.9 1366.3	3.335670 3.389854 3.135543
H 14_2 (U. S. E.) reference mark,[1] 1913	45 54 35.517 122 49 03.980	1096.4 85.8	263 48 37	83 48 40	H 14_2 (U. S. E.)	80.95	1.90822
H 9_2 (U. S. E.), 1912	45 54 28.026 122 48 09.050	865.3 195.1	102 16 02.2 185 10 16.9	282 15 25.4 5 10 19.7	H 14_2 (U. S. E.) H 11 (U. S. E.)	1129.2 921.2	3.052787 2.964342
H 9_2 (U. S. E.) reference mark,[1] 1913	45 54 28.871 122 48 08.811	891.4 189.9	11 11 26	191 11 26	H 9_2 (U. S. E.)	26.59	1.42472
Dock (U. S. E.), 1912	45 54 04.730 122 48 37.205	146.0 802.0	152 37 29.9 202 51 10.9 220 09 14.7	332 37 13.3 22 51 33.9 40 09 34.9	H 14_2 (U. S. E.) H 11 (U. S. E.) H 9_2 (U. S. E.)	1080.1 1776.1 941.1	3.033448 3.249477 2.973630

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
H 7₂ (U. S. E.), 1912	45 54 10.374	320.3	76 40 19.6	256 39 55.1	Dock (U. S. E.)	755.9	2.878492
	122 48 03.081	66.4	166 43 02.0	346 42 57.7	H 9₂ (U. S. E.)	559.9	2.748132
H 7₂ (U. S. E.) reference mark,[1] 1913	45 54 10.718	330.9	71 13 08	251 13 07	H 7₂ (U. S. E.)	33.00	1.51851
	122 48 01.632	35.2					
H 8₂ (U. S. E.), 1912	45 53 33.049	1020.4	159 36 18.1	339 36 06.0	Dock (U. S. E.)	1043.5	3.018493
	122 48 20.336	438.4	188 09 20.3	8 09 28.4	H 9₂ (U. S. E.)	1714.7	3.234183
			197 53 13.7	17 53 26.1	H 7₂ (U. S. E.)	1210.9	3.083118
H 8₂ (U. S. E.) reference mark,[1] 1913	45 53 31.924	985.6	221 46 13	41 46 14	H 8₂ (U. S. E.)	46.57	1.66811
	122 48 21.775	469.5					
H 5₂ (U. S. E.), 1912	45 53 06.263	193.4	116 05 49.8	296 04 53.6	H 8₂ (U. S. E.)	1880.5	3.274283
	122 47 02.005	43.2	146 22 20.4	326 21 36.6	H 7₂ (U. S. E.)	2377.4	3.376098
H 5₂ (U. S. E.) reference mark,[1] 1913	45 53 07.471	230.7	24 03 26	204 03 25	H 5₂ (U. S. E.)	40.84	1.61109
	122 47 01.233	26.6					
H 6₂ (U. S. E.), 1912	45 52 32.310	997.5	164 28 25.1	344 28 07.8	H 8₂ (U. S. E.)	1946.3	3.289220
	122 47 56.173	1211.4	177 10 58.9	357 10 54.0	H 7₂ (U. S. E.)	3031.3	3.481635
			228 05 17.8	48 05 56.7	H 5₂ (U. S. E.)	1569.5	3.195759
H 6₂ (U. S. E.) reference mark,[1] 1913	45 52 32.339	998.4	273 07	93 07	H 6₂ (U. S. E.)	16.7	1.22272
	122 47 56.946	1228.2					
H 3 (U. S. E.), 1912	45 52 04.948	152.8	116 49 07.2	296 48 11.6	H 6₂ (U. S. E.)	1873.0	3.272530
	122 46 38.668	834.1	165 06 47.4	345 06 30.7	H 5₂ (U. S. E.)	1958.9	3.292002
H 3 (U. S. E.) reference mark,[1] 1913	45 52 04.555	140.6	107 30 07	287 30 06	H 3 (U. S. E.)	40.31	1.60541
	122 46 36.886	795.6					
H 4 (U. S. E.), 1912	45 51 23.527	726.4	164 52 41.9	344 52 22.8	H 6₂ (U. S. E.)	2199.8	3.342389
	122 47 29.564	637.8	190 36 37.1	10 36 56.8	H 5₂ (U. S. E.)	3227.1	3.508816
			220 38 29.9	40 39 06.4	H 3 (U. S. E.)	1685.5	3.226720
H 4 (U. S. E.) reference mark,[1] 1913	45 51 21.996	679.1	167 52 30	347 52 30	H 4₂ (U. S. E.)	48.35	1.68440
	122 47 29.093	627.7					
H 1₂ (U. S. E.), 1912	45 51 15.169	468.3	106 00 47.6	286 00 17.7	H 4 (U. S. E.)	935.6	2.971104
	122 46 47.879	1033.0	187 21 53.5	7 22 00.1	H 3 (U. S. E.)	1549.7	3.190235
H 1₂ (U. S. E.) reference mark,[1] 1913	45 51 14.086	434.9	133 27 49	313 27 48	H 1₂ (U. S. E.)	48.60	1.68664
	122 46 46.244	997.7					
Warrior (U. S. E.), 1912	45 50 56.760	1752.4	163 27 43.3	343 27 35.1	H 4 (U. S. E.)	862.0	2.935521
	122 47 18.192	392.5	202 02 39.0	22 03 07.0	H 3 (U. S. E.)	2271.3	3.356273
			229 00 23.7	49 00 45.4	H 1₂ (U. S. E.)	866.4	2.937738
Warrior (U. S. E.) reference mark,[1] 1913	45 50 58.394	1802.9	321 46 08	141 46 09	Warrior (U. S. E.)	64.24	1.80781
	122 47 20.034	432.3					
Lake (U. S. E.), 1912	45 50 35.966	1110.4	143 35 52.2	323 35 36.5	Warrior (U. S. E.)	797.7	2.901833
	122 46 56.253	1213.9	153 55 16.0	333 54 52.0	H 4 (U. S. E.)	1634.9	3.213483
			188 29 17.1	8 29 23.1	H 1₂ (U. S. E.)	1223.8	3.087693
Lake (U. S. E.) reference mark,[1] 1913	45 50 35.051	1082.2	156 06 51	336 06 51	Lake (U. S. E.)	30.90	1.48996
	122 46 55.673	1201.4					
Eleven (U. S. E.), 1912	45 50 14.063	434.2	199 36 43.0	19 36 58.6	Warrior (U. S. E.)	1399.4	3.145953
	122 47 39.963	862.5	234 21 32.8	54 22 04.1	Lake (U. S. E.)	1160.6	3.064682
Eleven (U. S. E.) reference mark,[1] 1913	45 50 13.184	407.1	206 17 08	26 17 08	Eleven (U. S. E.)	30.27	1.48101
	122 47 40.584	875.9					
Ten (U. S. E.), 1912	45 50 10.868	335.5	96 47 05.0	276 46 37.5	Eleven (U. S. E.)	835.3	2.921822
	122 47 01.531	33.0	165 45 43.5	345 45 31.6	Warrior (U. S. E.)	1461.8	3.164878
			188 21 39.8	8 21 43.6	Lake (U. S. E.)	783.2	2.893850
Ten (U. S. E.) reference mark,[1] 1913	45 50 10.683	329.8	98 03 56	278 03 55	Ten (U. S. E.)	40.72	1.60981
	122 46 59.663	1287.6					
Nine (U. S. E.), 1912	45 49 27.206	840.0	189 40 38.6	9 40 46.8	Eleven (U. S. E.)	1467.5	3.166592
	122 47 51.394	1109.4	218 35 53.2	38 36 28.9	Ten (U. S. E.)	1725.0	3.236779
Nine (U. S. E.) reference mark,[1] 1913	45 49 27.247	841.2	275 45 28	95 45 28	Nine (U. S. E.)	12.68	1.10312
	122 47 51.978	1122.0					
Eight (U. S. E.), 1912	45 49 25.205	778.2	93 59 08.6	273 58 39.1	Nine (U. S. E.)	889.8	2.949280
	122 47 10.275	221.8	156 59 12.4	336 58 51.1	Eleven (U. S. E.)	1638.9	3.214554
Seven 2 (U. S. E.), 1912	45 48 46.813	1445.3	181 13 37.8	1 13 38.7	Nine (U. S. E.)	1247.4	3.096002
	122 47 52.633	1136.4	217 38 41.2	37 39 11.6	Eight (U. S. E.)	1497.1	3.175238
Seven 2 (U. S. E.) reference mark,[1] 1913	45 48 46.836	1446.0	270 57 53	90 57 54	Seven 2 (U. S. E.)	42.85	1.63195
	122 47 54.617	1179.2					
Six (U. S. E.), 1912	45 48 46.325	1430.2	90 48 34.5	270 47 58.9	Seven 2 (U. S. E.)	1072.4	3.030343
	122 47 02.969	64.1	140 22 12.8	320 21 38.1	Nine (U. S. E.)	1538.9	3.214552
Six (U. S. E.) reference mark,[1] 1913	45 48 46.470	1434.7	75 48 35	255 48 34	Six (U. S. E.)	18.22	1.26055
	122 47 02.151	46.4					

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Five 2 (U. S. E. , 1912	45 48 21.992	679.0	174 01 39.6	354 01 36.9	Seven 2 (U. S. E.)	770.5	2.886764
	122 47 48.920	1056.4	232 51 46.9	52 52 19.8	Six (U. S. E.)	1244.5	3.094989
Five 2 (U. S. E.) reference mark No. 1,[1] 1913.	45 48 20.427	630.7	198 08 43	18 08 44	Five 2 (U. S. E.)	50.85	1.70629
	122 47 49.553	1072.2					
Five 2 (U. S. E.) reference mark No. 2,[1] 1913.	45 48 22.788	703.6	299 38 13	119 38 14	Five 2 (U. S. E.)	49.70	1.69636
	122 47 50.921	1099.6					
Two (U. S. E.), 1912	45 47 53.365	1647.6	119 57 08.5	299 56 17.6	Five 2 (U. S. E.)	1770.5	3.248108
	122 46 37.876	818.0	161 40 01.1	341 39 43.1	Six (U. S. E.)	1722.5	3.236161
One 2 (U. S. E.), 1912	45 47 55.744	1721.0	168 36 33.5	348 36 28.1	Five 2 (U. S. E.)	826.6	2.917317
	122 47 41.360	893.2	207 57 26.3	27 57 58.8	Six (U. S. E.)	1768.0	3.247478
			273 03 37.7	93 04 23.2	Two (U. S. E.)	1373.0	3.137661
One 2 (U. S. E.) reference mark,[1] 1913.	45 47 52.238	1612.8	197 33 57	17 33 58	One 2 (U. S. E.)	113.54	2.055149
	122 47 42.947	927.5					
D (U. S. E.), 1912	45 47 20.454	631.5	152 50 08.4	332 49 49.9	One 2 (U. S. E.)	1224.6	3.088011
	122 47 15.471	334.2	218 37 29.7	38 37 56.7	Two (U. S. E.)	1300.7	3.114165
D (U. S. E.) reference mark,[1] 1913	45 47 19.585	604.7	155 55 18	335 55 18	D. (U. S. E.)	29.40	1.46835
	122 47 14.916	322.2					
A (U. S. E.), 1912	45 47 26.733	825.4	79 23 28.4	259 22 54.1	D (U. S. E.)	1052.6	3.022273
	122 46 27.571	595.5	119 20 38.6	299 19 45.8	One 2 (U. S. E.)	1828.1	3.262003
			164 51 13.5	344 51 06.2	Two (U. S. E.)	851.8	2.930341
A (U. S. E.) reference mark,[1] 1913	45 47 27.581	851.5	61 31 47	241 31 45	A (U. S. E.)	54.90	1.73757
	122 46 25.337	547.3					
E (U. S. E.), 1912	45 47 02.484	76.7	147 01 38.2	327 01 26.3	D (U. S. E.)	661.3	2.820397
	122 48 58.809	1270.4	222 01 29.2	42 01 51.6	A (U. S. E.)	1007.8	3.003394
E (U. S. E.) reference mark,[1] 1913	45 47 01.203	37.1	212 06 28	32 06 29	E (U. S. E)	46.70	1.66932
	122 46 59.958	1295.2					
B (U. S. E.), 1912	45 47 10.104	312.0	75 38 49.7	255 38 19.2	E (U. S. E.)	948.8	2.977176
	122 46 16.258	351.2	104 01 52.4	284 01 10.0	D (U. S. E.)	1318.3	3.120029
			154 32 42.8	334 32 34.7	A (U. S. E.)	568.6	2.754789
B (U. S. E.) reference mark,[1] 1913	45 47 10.288	317.6	80 19 21	216 19 20	B (U. S. E.)	33.72	1.52789
	122 46 14.719	317.9					
Dead Willow (U. S. E.), 1912	45 46 39.013	1204.5	146 16 58.4	326 16 42.4	E (U. S. E.)	871.2	2.940109
	122 46 36.423	786.9	204 24 27.1	24 24 41.6	B (U. S. E.)	1054.1	3.022886
Dead Willow (U. S. E.) reference mark,[1] 1913.	45 46 38.448	1187.0	231 34 43	51 34 44	Dead Willow (U. S. E.)	28.05	1.44793
	122 46 37.440	808.9					
C (U. S. E.), 1912	45 46 44.007	1358.7	80 43 50.2	260 43 18.9	Dead Willow (U. S. E.)	956.8	2.980637
	122 45 52.713	1138.8	111 46 58.2	291 46 10.8	E (U. S. E.)	1537.6	3.186845
			147 44 15.6	327 43 58.7	B (U. S. E.)	952.8	2.979009
C (U. S. E.) reference mark,[1] 1913	45 46 44.161	1363.4	76 35 54	256 35 53	C (U. S. E.)	20.50	1.31175
	122 45 51.790	1118.9					
Grassy (U. S. E.), 1912	45 46 22.546	696.1	147 10 40.7	327 10 29.8	Dead Willow (U. S. E.)	605.0	2.781734
	122 46 21.246	459.0	222 55 53.4	42 56 13.8	C (U. S. E.)	905.0	2.956646
Grassy (U. S. E.) reference mark,[1] 1913.	45 46 22.396	691.5	262 41 02	82 41 03	Grassy (U. S. E.)	36.48	1.56205
	122 46 22.921	495.2					
Fales (U. S. E.), 1912	45 45 56.237	1736.3	126 31 54.3	306 31 18.0	Grassy (U. S. E.)	1364.7	3.135033
	122 45 30.494	658.9	161 58 15.9	341 58 00.0	C (U. S. E.)	1551.0	3.190614
Fales (U. S. E.) reference mark,[1] 1913.	45 45 56.167	1734.1	92 33 41	272 33 39	Fales (U. S. E.)	48.42	1.68502
	122 45 28.256	610.6					
Ridge (U. S. E.), 1912	45 45 47.395	1463.3	157 51 29.2	337 51 14.6	Grassy (U. S. E.)	1171.6	3.068794
	122 46 00.809	17.5	185 42 48.4	5 42 54.2	C (U. S. E.)	1756.5	3.244655
			247 22 34.3	67 22 56.0	Fales (U. S. E.)	709.7	2.851054
Ridge (U. S. E.) reference mark,[1] 1913.	45 45 46.138	1424.5	162 14 07	342 14 07	Ridge (U. S. E.)	40.74	1.61002
	122 46 00.234	5.1					
W 11 (U. S. E.), 1912	45 45 16.320	503.9	142 35 05.9	322 34 41.6	Ridge (U. S. E.)	1208.0	3.082063
	122 45 26.846	580.2	176 20 18.0	356 20 15.4	Fales (U. S. E.)	1234.9	3.091628
W 16 (U. S. E.), 1912	45 45 15.702	484.8	181 40 43.6	1 40 44.6	Ridge (U. S. E.)	978.9	2.990723
	122 46 02.137	46.2	208 39 00.9	28 39 23.6	Fales (U. S. E.)	1426.0	3.154133
			268 34 00.4	88 34 25.7	W 11 (U. S. E.)	763.0	2.882518
W 16 (U. S. E.) reference mark No. 1,[1] 1913.	45 45 16.043	495.3	290 28 52	110 28 51	W 16 (U. S. E.)	30.13	1.47900
	122 46 03.443	74.4					
W 16 (U. S. E.) reference mark No. 2,[1] 1913.	45 45 16.228	501.0	290 28 52	110 28 51	W 16 (U. S. E.)	46.37	1.66624
	122 46 04.147	89.6					
W 14 (U. S. E.), 1912	45 44 52.159	1610.4	206 31 38.6	26 31 50.6	W 16 (U. S. E.)	812.4	2.909760
	122 46 18.925	409.1	236 27 55.5	56 28 32.8	W 11 (U. S. E.)	1350.3	3.130443

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
W 14 (U.S. E.) reference mark,[1] 1913..	45 44 52.716 122 46 21.028	1627.6 454.5	290 42 57	110 42 58	W 14 (U. S. E.)	48.60	1.68664
W 9 (U. S. E.), 1912	45 44 39.746 122 45 25.694	1227.1 555.4	108 25 31.2 144 38 34.7	288 24 53.1 324 38 08.6	W 14 (U. S. E.) W 16 (U. S. E.)	1212.8 1361.2	3.083791 3.133912
W 9 (U. S. E.) reference mark,[1] 1913..	45 44 39.894 122 45 24.820	1231.7 536.6	76 22 56	256 22 55	W 9 (U. S. E.)	19.45	1.28892
W 12_3 (U. S. E.), 1912	45 44 21.122 122 46 32.832	652.1 709.8	197 25 02.6 248 22 55.7	17 25 12.6 68 23 43.8	W 14 (U. S. E.) W 9 (U. S. E.)	1004.3 1561.1	3.001842 3.193440
W 7_3 (U. S. E.), 1912	45 44 10.952 122 45 13.315	338.1 287.9	100 21 32.0 131 53 49.6 163 14 50.9	280 20 35.1 311 53 02.7 343 14 42.1	W 12_3 (U. S. E.) W 14 (U. S. E.) W 9 (U. S. E.)	1747.6 1905.3 928.4	3.242434 3.279966 2.967727
W 7_3 (U. S. E.) reference mark No. 1,[1] 1913.	45 44 11.285 122 45 12.011	348.4 259.7	69 58 39	249 58 38	W 7_3 (U. S. E.)	30.00	1.47712
W 7_3 (U. S. E.) reference mark No. 2,[1] 1913.	45 44 11.617 122 45 10.708	358.7 231.5	69 58 40	249 58 38	W 7_3 (U. S. E.)	60.00	1.77815
W 10_3 (U. S. E.), 1912	45 43 27.732 122 46 20.316	856.2 439.3	170 40 37.9 207 58 15.6 227 20 50.7	350 40 29.0 27 58 54.8 47 21 38.7	W 12_3 (U. S. E.) W 9 (U. S. E.) W 7_3 (U. S. E.)	1670.4 2517.5 1969.6	3.222814 3.400964 3.294368
W 10_3 (U. S. E.) reference mark,[1] 1913.	45 43 25.263 122 46 22.377	780.0 483.9	210 19 07	30 19 08	W 10_3 (U. S. E.)	88.30	1.94596
W 5_3 (U. S. E.), 1912	45 43 02.055 122 45 26.747	63.4 578.5	124 23 15.2 187 46 26.5	304 22 36.8 7 46 36.1	W 10_3 (U. S. E.) W 7_3 (U. S. E.)	1403.7 2146.6	3.147289 3.331782
W 5_3 (U. S. E.) reference mark,[1] 1913..	45 43 01.859 122 45 25.092	57.4 542.7	99 35 30	279 35 29	W 5_3 (U. S. E.)	36.30	1.55991
Range 2 (U. S. E.), 1913	45 43 36.398 122 45 14.495	1123.7 313.3	79 21 44.2 149 13 50.1 181 22 08.6	259 20 57.1 329 13 04.1 1 22 09.5	W 10_3 (U. S. E.) W 14 (U. S. E.) W 7_3 (U. S. E.)	1448.3 2722.4 1067.1	3.160846 3.434946 3.028206
Range 2 (U. S. E.) reference mark,[1] 1913.	45 43 36.552 122 45 11.498	1128.5 248.6	85 48 39	265 48 37	Range 2 (U. S. E.)	64.97	1.81271
W 8_3 (U. S. E.), 1912	45 43 00.634 122 46 21.648	19.6 468.2	181 58 11.7 214 14 02.7 267 52 46.2	1 58 12.6 34 14 51.6 87 53 25.5	W 10_3 (U. S. E.) W 7_3 (U. S. E.) W 5_3 (U. S. E.)	837.1 2626.0 1188.2	2.922755 3.419296 3.074876
W 6 (U. S. E.), 1912	45 42 34.127 122 46 15.612	1053.6 337.7	170 56 11.8 230 47 13.7	350 56 07.5 50 47 48.7	W 8_3 (U. S. E.) W 5_3 (U. S. E.)	828.7 1364.0	2.918404 3.134804
W 6 (U. S. E.) reference mark,[1] 1913...	45 42 35.177 122 46 16.739	1086.1 362.1	323 04 33	143 04 34	W 6 (U. S. E.)	40.57	1.60820
W 3 (U. S. E.), 1912	45 41 51.669 122 45 35.926	1595.2 777.3	146 46 52.2 155 05 20.7 185 13 08.2	326 46 23.8 335 04 48.0 5 13 14.8	W 6 (U. S. E.) W 8_3 (U. S. E.) W 5_3 (U. S. E.)	1567.0 2347.7 2182.1	3.195056 3.370641 3.338873
W 3 (U. S. E.) reference mark,[1] 1913...	45 41 51.543 122 45 33.752	1591.3 730.2	94 43 22	274 43 20	W 3 (U. S. E.)	47.20	1.67394
W 4_3 (U. S. E.), 1912	45 42 06.095 122 46 25.030	188.2 541.5	193 14 42.3 216 06 44.2 292 44 30.3	13 14 49.0 36 07 25.9 112 45 05.4	W 6 (U. S. E.) W 5_3 (U. S. E.) W 3 (U. S. E.)	889.1 2138.7 1151.9	2.948944 3.330149 3.061422
W 4_3 (U. S. E.) reference mark,[1] 1913..	45 42 05.291 122 46 26.421	163.4 571.6	230 27	50 27	W 4_3 (U. S. E.)	39.00	1.59106
Brush$_3$ (U. S. E.), 1913	45 42 37.551 122 45 28.237	1159.5 610.8	6 41 52.9 84 06 55.4	186 41 47.4 264 06 21.5	W 3 (U. S. E.) W 6 (U. S. E.)	1426.3 1030.2	3.154201 3.012916
W 1 (U. S. E.), 1912	45 41 29.938 122 45 44.494	924.3 962.7	141 50 53.6 195 26 38.5	321 50 24.6 15 26 44.6	W 4_3 (U. S. E.) W 3 (U. S. E.)	1419.6 696.0	3.152167 2.842621
W 2_3 (U. S. E.), 1912	45 41 26.444 122 46 38.026	816.4 822.8	192 56 02.0 239 53 49.9 264 40 27.4	12 56 11.3 59 54 34.3 84 41 05.7	W 4_3 (U. S. E.) W 3 (U. S. E.) W 1 (U. S. E.)	1256.0 1553.0 1163.3	3.098998 3.191163 3.065698
W 2_3 (U. S. E.) reference mark,[1] 1913..	45 41 28.546 122 46 41.098	881.3 889.3	314 18 29	134 18 31	W 2_3 (U. S. E.)	92.90	1.96802
Jewetts (U. S. E.), 1913	45 40 54.049 122 46 43.009	1668.6 930.8	186 09 08.5 228 48 22.3	6 09 12.1 48 49 04.2	W 2_3 (U. S. E.) W 1 (U. S. E.)	1005.9 1682.6	3.002575 3.225971
Hewletts 2 (U. S. E.), 1913	45 40 53.313 122 45 59.351	1645.9 1284.4	340 35 32.1 24 23 52.0 91 22 48.2 140 42 44.1	160 35 42.1 204 23 33.7 271 22 16.9 320 42 16.4	One 3 (U. S. E.) Two 2 (U. S. E.) Jewetts (U. S. E.) W 2_3 (U. S. E.)	913.6 1336.8 945.1 1321.6	2.960769 3.126056 2.975480 3.121105
Morgans 2 (U. S. E.), 1913	45 40 38.515 122 46 36.547	1189.1 790.9	163 44 22.1 215 21 03.4 240 25 10.9 290 03 23.1 341 36 14.7	343 44 17.5 35 21 40.7 60 25 37.6 110 03 59.8 161 36 23.1	Jewetts (U. S. E.) W 1 (U. S. E.) Hewletts (U. S. E.) One 3 (U. S. E.) Two 2 (U. S. E.)	499.5 1946.6 925.6 1180.2 801.5	2.698568 3.289271 2.966424 3.071968 2.903908

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Morgans 2 (U. S. E.) reference mark,[1] 1913.	45 40 38.661 122 46 38.160	1193.6 825.9	277 22 13	97 22 14	Morgans 2 (U. S. E)	35.21	1.54667
One 3 (U. S. E.), 1912	45 40 25.402 122 45 45.325	784.2 981.0	148 49 22.5 180 30 58.7	328 48 44.8 0 30 59.3	W 2_2 (U. S. E.) W 1 (U. S. E.)	2202.8 1992.5	3.342977 3.299399
One 3 (U. S. E.) reference mark,[1] 1913	45 40 25.627 122 45 43.917	791.2 950.5	77 08 13	257 08 12	One 3 (U. S. E.)	31.26	1.49499
Two 2 (U. S. E.), 1912	45 40 13.880 122 46 24.862	428.5 538.2	172 45 09.9 200 24 09.9 247 25 21.8	352 45 00.5 20 24 38.8 67 26 00.1	W 2_2 (U. S. E.) W 1 (U. S. E.) One 3 (U. S. E.)	2258.3 2505.4 926.7	3.353783 3.398870 2.966957
Two 2 (U. S. E.) reference mark,[1] 1913	45 40 14.232 122 46 27.379	439.4 592.6	281 16 30	101 16 32	Two 2 (U. S. E.)	55.55	1.74468
Middle, 1913	45 40 03.780 122 45 29.891	116.7 647.0	104 41 23.7 153 24 49.1	284 40 44.4 333 24 38.1	Two 2 (U. S. E.) One 3 (U. S. E.)	1230.1 746.5	3.089936 2.873008
Middle reference mark,[1] 1913	45 40 01.120 122 45 27.689	34.6 599.4	149 52 30	329 52 28	Middle	94.95	1.97750
Four 2 (U. S. E.), 1912	45 39 28.845 122 45 59.314	890.5 1284.1	156 18 34.9 189 50 11.6 210 33 43.0	338 18 16.6 9 50 21.6 30 34 04.0	Two 2 (U. S. E.) One 3 (U. S. E.) Middle	1496.3 1772.1 1252.6	3.175023 3.248489 3.097799
Four 2 (U. S. E.) reference mark,[1] 1913.	45 39 28.890 122 46 00.696	891.9 15.1	272 39 56	92 39 57	Four 2 (U. S. E.)	29.96	1.47654
Mud, 1913	45 38 50.358 122 45 57.410	1554.7 1243.2	178 00 44.3 194 43 23.7 67 30 05.3	358 00 43.0 14 43 43.4 247 29 31.4	Four 2 (U. S. E.) Middle Howell	1188.9 2343.7 1112.4	3.075154 3.369907 3.046277
Mud reference mark, No. 1,[1] 1913	45 38 50.402 122 45 56.033	1556.1 1213.3	87 24 06	267 24 05	Mud	29.85	1.47494
Mud reference mark, No. 2,[1] 1913	45 38 50.414 122 45 55.660	1556.4 1205.2	87 24 06	267 24 05	Mud	37.94	1.57910
School, 1913	45 39 01.251 122 46 18.651	38.6 403.7	206 10 09.3 306 10 24.3 36 41 20.3	26 10 23.1 126 10 39.4 216 41 01.5	Four 2 (U. S. E.) Mud Howell	949.2 569.8 950.3	2.977358 2.755707 2.977876
School reference mark,[1] 1913	45 39 02.910 122 46 19.164	89.8 415.0	347 45 08	167 45 08	School	52.4	1.71933
Three 3 (U. S. E.), 1912	45 39 49.186 122 45 19.498	1518.5 422.1	40 52 42.1 53 55 44.4 118 19 17.9 153 26 05.3	220 51 59.8 233 55 15.9 298 18 31.1 333 25 46.8	School Four 2 (U. S. E.) Two 2 (U. S. E.) One 3 (U. S. E.)	1957.1 1066.5 1607.2 1250.1	3.291609 3.027955 3.206083 3.096928
Three 3 (U. S. E.) reference mark,[1] 1913.	45 39 49.858 122 45 17.065	1539.3 369.4	68 30 42	248 30 40	Three 3 (U. S. E.)	56.60	1.75282
End, 1913	45 39 32.732 122 46 02.391	1010.4 51.8	192 47 50.5 241 18 53.5 330 57 37.1 19 54 42.2	12 48 02.7 61 19 24.2 150 57 39.3 199 54 30.6	One 3 (U. S. E.) Three 3 (U. S. E.) Four 2 (U. S. E.) School	1667.5 1058.5 137.3 1033.7	3.222059 3.024677 2.137536 3.014385
End reference mark,[1] 1913	45 39 30.314 122 46 02.596	935.9 56.2	183 24 07	3 24 07	End	74.78	1.87379
Pen, 1913	45 38 20.005 122 46 25.174	617.6 545.2	140 09 48.6 186 19 43.1 212 40 54.7	320 09 34.5 6 19 47.8 32 41 14.5	Howell School Mud	665.9 1281.2 1113.4	2.823387 3.107612 3.046632
Pen reference mark,[1] 1913	45 38 18.725 122 46 28.711	578.1 621.8	242 43 00	62 43 02	Pen	86.2	1.93551
Linton, 1913	45 36 02.300 122 47 19.807	71.0 429.2	189 01 34.1 195 33 07.9 233 57 10.0	9 01 59.1 15 33 47.0 53 58 07.0	Howell Pen Gatton	4822.5 4413.1 2136.9	3.683269 3.644744 3.329794
Linton reference mark,[1] 1913	45 36 01.888 122 47 19.801	58.3 429.1	179 25 54	359 25 54	Linton	12.72	1.10449
Sand, 1913	45 37 28.351 122 47 14.124	875.3 306.0	196 44 27.7 311 05 17.8 2 39 17.4	16 44 48.6 131 06 10.7 182 39 12.8	Howell Gatton Linton	2199.3 2129.0 2659.5	3.342278 3.328178 3.424805
Sand reference mark,[1] 1913	45 37 27.643 122 47 12.967	853.4 280.9	131 05 19	311 05 18	Sand	33.25	1.52179
Howell, 1881	45 38 36.566 122 46 44.871	1128.9 971.7	15 31 31.9 133 46 01.1	195 30 53.1 313 41 50.6	Willamet Bouser	4391.1 10486.3	3.642575 4.020622
Howell reference mark No. 1,[1] 1913	45 38 37.445 122 46 42.851	1156.0 928.0	58 11 13	238 11 12	Howell	51.49	1.71172
Howell reference mark No. 2,[1] 1913	45 38 40.620 122 46 43.856	1254.1 949.7	9 57 33	189 57 32	Howell	127.10	2.10415

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Gatton, 1883	45 36 43.022	1328.2	71 19 51.6	251 18 40.8	Willamet	2265.5	3.355156
	122 46 00.069	1.5	164 31 45.5	344 31 13.5	Howell	3637.3	3.560782
Gatton reference mark No. 1,[1] 1913	45 36 44.796	1383.0	2 00 19	182 00 19	Gatton	54.80	1.73878
	122 45 59.981	1299.6					
Gatton reference mark No. 2,[1] 1913	45 36 42.856	1323.1	232 37 34	52 37 34	Gatton	8.42	0.92531
	122 46 00.378	8.2					
Springville, 1883	45 35 04.047	125.0	140 21 15.0	320 20 11.3	Willamet	3026.5	3.480941
	122 46 10.000	216.8	184 01 43.0	4 01 50.1	Gatton	3063.2	3.486180
Watts, 1883	45 35 39.329	1214.2	208 00 22.2	28 00 56.7	Gatton	2227.3	3.347784
	122 46 48.337	1047.7	322 39 19.9	142 39 47.3	Springville	1370.0	3.136736
Kaiser, 1883	45 36 16.003	494.0	244 50 30.5	64 51 29.4	Gatton	1962.8	3.292867
	122 47 22.059	478.0	324 54 00.4	144 53 51.9	Springville	2715.6	3.433865
St. John, 1883	45 35 22.221	686.0	34 02 34.2	214 02 21.7	Springville	677.1	2.830654
	122 45 52.516	1138.4	113 35 16.1	293 34 36.2	Watts	1320.2	3.120648
			130 33 29.2	310 32 25.1	Kaiser	2554.1	3.407241
Caples, 1883	45 34 56.731	1751.5	97 31 15.6	277 30 19.2	Springville	1727.5	3.237423
	122 44 50.999	1105.7	120 33 04.6	300 32 20.7	St. John	1548.5	3.189898
Caples reference mark,[1] 1913	45 34 57.634	1779.3	42 20 52	222 20 51	Caples	37.72	1.57657
	122 44 49.827	1080.2					
Hazel, 1883	45 34 36.082	1113.9	165 01 26.9	345 01 14.4	St. John	1474.5	3.168657
	122 45 34.938	757.6	236 12 18.2	56 12 49.6	Caples	1146.2	3.059278
Waud, 1882	45 34 19.484	601.5	102 40 18.4	282 39 03.3	Hazel	2337.9	3.368820
	122 43 49.738	1078.5	130 53 25.5	310 52 41.8	Caples	1756.9	3.244738
			339 02 22.4	159 03 18.8	Balch	4790.6	3.680388
Scott, 1882	45 33 23.862	736.7	161 40 15.8	341 39 44.5	Caples	3020.5	3.480073
	122 44 07.186	155.8	192 25 29.6	12 25 42.0	Waud	1758.4	3.245123
Scott reference mark,[1] 1913	45 33 23.337	720.5	212 49 44	32 49 44	Scott	19.28	1.28511
	122 44 07.668	166.3					
Gravel Bluff, 1882	45 33 12.226	377.4	95 53 01.3	275 51 06.3	Scott	3513.8	3.545773
	122 41 26.035	564.6	123 41 20.4	303 39 37.8	Waud	3744.9	3.573437
			30 21 55.5	210 21 09.3	Balch	2778.3	3.443786
Potter, 1883	45 33 01.778	54.9	174 47 38.7	354 47 31.6	Waud	2409.0	3.381832
	122 43 39.658	860.3	263 38 10.0	83 39 45.4	Gravel Bluff	2916.3	3.464835
			324 13 23.8	144 14 13.0	Balch	2557.1	3.407753
Montgomery, 1882	45 32 13.180	406.9	78 17 17.9	258 15 46.9	Balch	2826.9	3.451313
	122 40 23.196	503.3	109 24 44.8	289 22 24.6	Potter	4518.5	3.654993
			143 12 56.6	323 12 11.8	Gravel Bluff	2276.3	3.357228
King, 1883	45 31 34.049	1052.2	156 22 17.4	336 21 04.0	Waud	5575.3	3.746266
	122 42 06.683	145.0	196 13 06.1	16 13 35.1	Gravel Bluff	3156.7	3.499233
			241 42 36.5	61 43 50.3	Montgomery	2549.9	3.406528
Tibbets, 1882	45 29 56.151	1733.5	132 03 12.7	312 01 22.5	King	4513.5	3.654513
	122 39 32.251	700.2	165 21 26.2	345 20 49.8	Montgomery	4372.6	3.640735
Hoffmans Hill, 1883	45 30 23.710	732.0	196 31 41.2	16 32 14.2	Montgomery	3525.4	3.547207
	122 41 09.420	204.5	291 57 18.2	111 58 27.5	Tibbets	2274.6	3.356914
Forty (U. S. E.), 1913	45 33 46.496	1435.4	12 37 41.2	192 37 36.1	Scott	716.1	2.854990
	122 43 59.967	1300.6	152 58 09.5	332 57 33.1	Caples	2434.4	3.386385
Forty (U. S. E.) reference mark,[1] 1913	45 33 45.367	1400.6	194 25 13	14 25 13	Forty (U. S. E.)	36.0	1.55630
	122 44 00.380	8.2					
R (U. S. E.), 1913	45 34 05.763	177.9	27 58 22.2	207 57 59.6	Scott	1464.7	3.165749
	122 43 35.510	770.1	41 43 29.5	221 43 12.0	Forty (U. S. E.)	796.9	2.901422
			133 52 44.6	313 51 50.7	Caples	2270.5	3.356114
R (U. S. E.) reference mark,[1] 1913	45 34 04.490	138.6	207 58 21	27 58 22	R (U. S. E.)	44.51	1.64846
	122 43 36.473	791.0					
Thirty-nine 2 (U. S. E.), 1913	45 34 20.740	640.3	325 28 14.1	145 28 24.6	R (U. S. E.)	561.3	2.749169
	122 43 50.181	1088.1	11 21 03.6	191 20 56.6	Forty (U. S. E.)	1078.3	3.032740
Thirty-eight 2 (U. S. E.), 1913	45 34 30.209	932.6	281 56 03.0	101 56 48.5	Thirty-nine 2 (U. S. E.)	1412.9	3.150121
	122 44 53.935	1169.5	319 03 50.7	139 04 29.2	Forty (U. S. E.)	1786.3	3.251950
Dike (U. S. E.), 1913	45 34 42.140	1301.0	330 58 29.2	150 58 41.3	Thirty nine 2 (U. S. E.)	755.5	2.878262
	122 44 07.088	153.7	70 04 19.9	250 03 46.5	Thirty-eight 2 (U. S. E.)	1080.4	3.033604
Thirty-seven (U. S. E.), 1913	45 34 56.780	1752.9	292 45 51.4	112 46 26.8	Dike (U. S. E.)	1167.8	3.067373
	122 44 56.755	1230.4	355 44 11.1	175 44 13.1	Thirty-eight 2 (U. S. E.)	822.6	2.915179
Thirty-nine (U. S. E.), 1913	45 34 19.092	589.4	10 17 38.2	190 17 32.1	Forty (U. S. E.)	1022.8	3.009779
	122 43 51.540	1117.6	129 27 24.8	309 26 38.2	Thirty-seven (U. S. E.)	1831.2	3.262727
			132 02 12.8	312 01 30.3	Caples	1735.6	3.239446

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Thirty-eight (U. S. E.), 1913	45 34 22.085	681.8	165 41 18.2	345 41 09.2	Thirty seven (U. S. E.)	1105.5	3.043541
	122 44 44.151	957.3	172 05 52.7	352 05 47.8	Caples	1079.9	3.033380
			274 37 30.9	94 38 08.5	Thirty-nine (U. S. E.)	1144.5	3.058623
			318 54 20.6	138 54 52.1	Forty (U. S. E.)	1457.8	3.163696
Forty-one (U. S. E.), 1899	45 33 41.432	1279.1	98 08 24.8	278 07 48.8	Forty (U. S. E.)	1104.9	3.043339
	122 43 09.531	206.7	141 55 29.0	321 54 59.0	Thirty-nine (U. S. E.)	1477.1	3.169397
Forty-two (U. S. E.), 1892	45 33 20.099	620.5	130 56 52.8	310 56 21.9	Forty (U. S. E.)	1243.6	3.094693
	122 43 16.654	361.2	193 12 03.1	13 12 08.2	Forty-one (U. S. E.)	676.5	2.830263
Forty-three (U. S. E.), 1906	45 33 31.125	960.9	66 36 34.0	246 36 08.1	Forty-two (U. S. E.)	857.3	2.933148
	122 42 40.376	875.7	116 42 58.2	296 42 37.4	Forty-one (U. S. E.)	707.9	2.849956
Forty-four (U. S. E.), 1909	45 33 07.053	217.7	115 27 16.7	295 26 48.8	Forty-two (U. S. E.)	937.2	2.971845
	122 42 37.639	816.5	124 18 02.5	304 17 03.7	Forty (U. S. E.)	2161.3	3.334722
			175 25 57.2	355 25 55.2	Forty-three (U. S. E.)	745.5	2.872467
Forty-four (U. S. E.) reference mark,[1] 1913	45 33 06.511	201.0	153 50 51	333 50 51	Forty-four (U. S. E.)	18.64	1.27045
	122 42 37.260	806.3					
F (U. S. E.), 1909	45 33 55.057	1699.7	346 33 20.5	166 33 32.1	Forty-four (U. S. E.)	1523.7	3.182913
	122 42 53.972	1170.4	79 32 42.5	259 31 55.3	Forty (U. S. E.)	1455.4	3.162989
			110 09 17.0	290 08 47.2	R (U. S. E.)	959.5	2.982058
T (U. S. E.), 1909	45 34 29.906	923.3	34 23 02.5	214 22 38.3	F (U. S. E.)	1303.6	3.115153
	122 42 20.024	434.2	65 31 30.5	245 30 36.6	R (U. S. E.)	1798.6	3.254923
T (U. S. E.) reference mark,[1] 1913	45 34 31.673	977.8	316 58 18	136 58 20	T (U. S. E.)	74.64	1.87297
	122 42 22.373	485.1					
P (U. S. E.), 1909	45 33 45.011	1389.6	41 52 42.7	221 52 08.1	Forty-four (U. S. E.)	1573.7	3.196935
	122 41 49.207	1067.2	102 27 33.2	282 26 47.0	F (U. S. E.)	1438.4	3.157873
			154 15 46.7	334 15 24.7	T (U. S. E.)	1538.7	3.187164
P (U. S. E.) reference mark,[1] 1913	45 33 45.935	1418.2	317 47 07	137 47 08	P (U. S. E.)	38.5	1.58546
	122 41 50.400	1093.0					
W (U. S. E.), 1909	45 33 28.001	864.5	10 28 52.7	190 28 49.5	Forty-five (U. S. E.)	531.2	2.725354
	122 41 36.350	788.4	64 03 50.5	244 03 06.7	Forty-four (U. S. E.)	1478.3	3.169770
			116 23 51.7	296 22 56.3	F (U. S. E.)	1879.3	3.273987
Thirty-six (U. S. E.), 1899	45 34 45.855	1415.7	237 32 34.9	57 32 52.4	Thirty-seven (U. S. E.)	628.5	2.798314
	122 45 21.218	460.1	242 51 41.5	62 52 03.2	Caples	736.2	2.866988
			309 13 52.2	129 14 11.7	Thirty-eight 2 (U. S. E.)	763.7	2.882920
			312 23 45.7	132 24 12.2	Thirty-eight (U. S. E.)	1088.3	3.036762
Forty-five (U. S. E.), 1906	45 33 11.078	342.0	84 14 59.6	264 14 19.0	Forty-four (U. S. E.)	1239.0	3.093075
	122 41 40.806	885.1	115 36 02.4	295 35 19.9	Forty-three (U. S. E.)	1432.6	3.156139
Forty-five 2 (U. S. E.), 1906	45 33 12.419	383.4	82 09 33	262 08 53	Forty-four (U. S. E.)	1213.3	3.083974
	122 41 42.227	915.9	171 26 39	351 26 34	P (U. S. E.)	1017.5	3.007546
Forty-six 2 (U. S. E.), 1906	45 32 51.294	1583.6	118 03 45	298 03 15	Forty-four (U. S. E.)	1034.4	3.014684
	122 41 55.559	1205.3	203 54 45	23 54 55	Forty-five 2 (U. S. E.)	713.4	2.853352
Forty-seven (U. S. E.), 1906	45 32 52.413	1618.1	86 40 50	266 40 30	Forty-six 2 (U. S. E.)	595.9	2.775182
	122 41 28.135	610.3	153 40 13	333 40 03	Forty-five 2 (U. S. E.)	689.2	2.838318
Forty-eight 2 (U. S. E.), 1906	45 32 32.752	1011.1	134 36 06	314 35 49	Forty-six 2 (U. S. E.)	815.3	2.911319
	122 41 28.800	624.8	181 21 38	1 21 39	Forty-seven (U. S. E.)	607.2	2.783310
Forty-nine 2 (U. S. E.), 1906	45 32 34.823	1075.1	82 05 26	262 05 11	Forty-eight 2 (U. S. E.)	464.6	2.667084
	122 41 07.588	164.6	140 37 20	320 37 06	Forty-seven 2 (U. S. E.)	702.6	2.846683
Fifty 2 (U. S. E.), 1906	45 32 24.967	770.8	129 52 35	309 52 26	Forty-eight 2 (U. S. E.)	374.9	2.573863
	122 41 15.540	337.1	209 33 03	29 33 09	Forty-nine 2 (U. S. E.)	349.8	2.543793
Fifty-one 2 (U. S. E.), 1906	45 32 24.138	745.2	93 16 39	273 16 24	Fifty 2 (U. S. E.)	447.8	2.651049
	122 40 54.935	1191.8	140 14 03	320 13 54	Forty-nine 2 (U. S. E.)	429.1	2.632600
Fifty-two 2 (U. S. E.), 1906	45 32 15.406	475.6	134 00 58	314 00 48	Fifty 2 (U. S. E.)	424.8	2.628201
	122 41 01.459	31.7	207 41 51	27 41 56	Fifty-one 2 (U. S. E.)	304.5	2.483572
Fifty-three 2 (U. S. E.), 1906	45 32 15.914	491.3	88 10 57	268 10 41	Fifty-two 2 (U. S. E.)	494.1	2.693830
	122 40 38.696	839.6	125 46 49	305 46 38	Fifty-one 2 (U. S. E.)	434.3	2.637774
Fifty-four 2 (U. S. E.), 1906	45 32 04.249	131.2	132 23 13	312 23 01	Fifty-two 2 (U. S. E.)	510.9	2.708371
	122 41 44.065	956.1	197 55 26	17 55 30	Fifty-three 2 (U. S. E.)	378.5	2.578059
Fifty-five 2 (U. S. E.), 1906	45 32 08.191	252.9	70 52 52	250 52 40	Fifty-four 2 (U. S. E.)	371.6	2.570039
	122 41 27.885	605.0	135 27 58	315 27 50	Fifty-three 2 (U. S. E.)	334.5	2.524349
Fifty-six 2 (U. S. E.), 1906	45 31 55.578	1715.8	132 54 25	312 54 15	Fifty-four 2 (U. S. E.)	393.2	2.594621
	122 41 30.791	668.1	189 11 57	9 11 50	Fifty-five 2 (U. S. E.)	394.5	2.596020
Fifty-seven 2 (U. S. E.), 1906	45 31 55.634	1717.6	89 42 35	269 42 24	Fifty-six 2 (U. S. E.)	339.0	2.530161
	122 41 15.170	329.2	144 33 49	324 33 40	Fifty-five 2 (U. S. E.)	475.8	2.677445
Fifty-eight 2 (U. S. E.), 1906	45 31 47.324	1461.0	135 08 54	315 08 46	Fifty-six 2 (U. S. E.)	359.4	2.555633
	122 41 19.108	414.6	198 25 25	18 25 28	Fifty-seven 2 (U. S. E.)	270.4	2.432012

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Fifty-nine 2 (U. S. E.), 1906	45 31 49.038	1513.9	77 18 16	257 18 06	Fifty-eight 2 (U. S. E.)	240.7	2.381520
	122 41 08.286	179.8	143 44 22	323 44 17	Fifty-seven 2 (U. S. E.)	252.5	2.402341
Union Depot, Portland (U. S. E.), 1906.	45 31 45.731	1411.8	188 38 27	8 38 31	Fifty-five 2 (U. S. E.)	701.4	2.845935
	122 41 32.741	710.5	231 16 32	51 16 45	Fifty-seven 2 (U. S. E.)	488.7	2.689053
			259 06 33	79 06 51	Fifty-nine 2 (U. S. E.)	540.4	2.732713
Thirty-five (U. S. E.), 1899	45 35 05.086	157.0	291 10 17.1	111 10 38.9	Thirty-seven (U. S. E.)	709.9	2.851203
	122 45 27.390	591.6	347 29 45.1	167 29 49.4	Thirty-six (U. S. E.)	608.1	2.783995
Thirty-four (U. S. E.), 1899	45 34 53.801	1661.0	224 39 23.7	44 39 35.1	Thirty-five (U. S. E.)	489.8	2.690024
	122 45 43.171	935.9	297 15 49.7	117 16 05.4	Thirty-six (U. S. E.)	535.4	2.728716
Thirty-three (U. S. E.), 1899	45 35 16.168	499.2	312 10 03.6	132 10 16.1	Thirty-five (U. S. E.)	509.6	2.707260
	122 45 44.715	969.4	357 13 29.6	177 13 30.7	Thirty-four (U. S. E.)	691.3	2.839696
Thirty-two (U. S. E.), 1899	45 35 09.052	279.5	242 59 37.4	62 59 51.6	Thirty-three (U. S. E.)	483.8	2.684704
	122 46 04.601	99.7	315 22 52.4	135 23 07.7	Thirty-four (U. S. E.)	661.5	2.820505
Thirty (U. S. E.), 1899	45 35 21.548	665.3	282 39 39.2	102 40 03.6	Thirty-three (U. S. E.)	757.6	2.879453
	122 46 18.815	407.9	321 23 07.2	141 23 17.4	Thirty-two (U. S. E.)	493.7	2.693493
Thirty-one (U. S. E.), 1899	45 35 31.622	976.3	53 11 57.9	233 11 44.2	Thirty (U. S. E.)	519.2	2.715322
	122 45 59.637	1292.7	325 51 50.9	145 52 01.6	Thirty-three (U. S. E.)	576.4	2.760744
Twenty-nine (U. S. E.), 1899	45 35 51.697	1596.0	3 31 19.1	183 31 17.2	Thirty (U. S. E.)	932.6	2.969682
	122 46 16.172	350.4	329 57 33.1	149 57 44.9	Thirty-one (U. S. E.)	716.0	2.854884
Twenty-eight (U. S. E.), 1899	45 35 36.360	1119.5	222 15 39.8	42 15 54.1	Twenty-nine (U. S. E.)	644.0	2.808876
	122 46 36.154	783.6	320 23 30.8	140 23 43.2	Thirty (U. S. E.)	589.6	2.770526
Twenty-six (U. S. E.), 1899	45 36 07.936	245.0	296 09 58.5	116 10 32.1	Twenty-nine (U. S. E.)	1136.7	3.055647
	122 47 03.244	70.3	329 01 04.5	149 01 23.8	Twenty-eight (U. S. E.)	1140.6	3.057151
Twenty-seven (U. S. E.), 1899	45 36 20.299	626.7	64 34 49.0	244 34 22.5	Twenty-six (U. S. E.)	889.1	2.948959
	122 46 26.189	567.5	346 11 13.0	166 11 20.1	Twenty-nine (U. S. E.)	909.3	2.958726
Twenty-five (U. S. E.), 1899	45 36 32.268	996.2	34 12 22.3	214 12 05.5	Twenty-six (U. S. E.)	908.3	2.958235
	122 46 39.682	859.9	321 38 43.3	141 38 53.0	Twenty-seven (U. S. E.)	471.2	2.673204
Twenty-four (U. S. E.), 1899	45 36 36.409	1124.1	278 25 54.9	98 26 23.3	Twenty-five (U. S. E.)	871.6	2.940298
	122 47 19.468	421.8	338 11 56.9	158 12 08.5	Twenty-six (U. S. E.)	946.8	2.976247
Twenty-three (U. S. E.), 1899	45 37 00.572	17.7	25 36 48.7	205 36 36.9	Twenty-four (U. S. E.)	827.3	2.917644
	122 47 02.964	64.2	329 59 58.7	150 00 15.3	Twenty-five (U. S. E.)	1009.0	3.003893
Twenty-two (U. S. E.), 1899	45 37 06.548	202.2	284 07 12.5	104 07 36.7	Twenty-three (U. S. E.)	756.1	2.878591
	122 47 36.808	797.5	338 00 37.5	158 00 49.9	Twenty-four (U. S. E.)	1003.5	3.001505
Twenty-one (U. S. E.), 1899	45 37 22.678	700.1	44 19 24.5	224 19 08.5	Twenty-two (U. S. E.)	696.1	2.842651
	122 47 14.360	311.1	340 06 38.5	160 06 46.7	Twenty-three (U. S. E.)	725.8	2.860805
Twenty (U. S. E.), 1899	45 37 33.741	1041.7	303 59 04.8	123 59 21.5	Twenty-one (U. S. E.)	611.0	2.786053
	122 47 37.747	817.6	358 36 43.8	178 36 44.5	Twenty-two (U. S. E.)	839.8	2.924174
Nineteen (U. S. E.), 1899	45 37 54.229	1674.2	13 23 06.2	193 22 58.5	Twenty-one (U. S. E.)	1001.3	3.000558
	122 47 03.661	79.3	49 25 04.2	229 24 39.8	Twenty (U. S. E.)	972.2	2.987778
Eighteen (U. S. E.), 1899	45 38 07.826	241.6	11 18 56.8	191 18 49.8	Twenty (U. S. E.)	1073.2	3.030669
	122 47 28.027	607.1	308 29 48.8	128 30 06.2	Nineteen (U. S. E.)	674.3	2.828883
Seventeen (U. S. E.), 1899	45 38 05.135	158.5	27 58 53.1	207 58 47.2	Nineteen (U. S. E.)	381.3	2.581253
	122 46 55.402	1200.0	96 42 28.1	276 42 04.8	Eighteen (U. S. E.)	711.5	2.852168
Sixteen (U. S. E.), 1899	45 38 21.072	650.6	41 39 25.8	221 39 13.8	Eighteen (U. S. E.)	547.4	2.738270
	122 47 11.230	243.2	325 07 59.8	145 08 11.1	Seventeen (U. S. E.)	599.7	2.777909
Fifteen (U. S. E.), 1899	45 38 13.179	406.9	34 04 23.6	214 04 18.1	Seventeen (U. S. E.)	299.8	2.476835
	122 46 47.648	1032.0	115 30 33.6	295 30 16.8	Sixteen (U. S. E.)	565.9	2.752741
Fourteen (U. S. E.), 1899	45 38 27.611	852.4	57 42 22.3	237 42 11.8	Sixteen (U. S. E.)	377.8	2.577290
	122 46 56.483	1223.3	336 45 25.3	156 45 31.6	Fifteen (U. S. E.)	484.9	2.685658
Thirteen (U. S. E.), 1899	45 38 19.118	590.2	42 59 33.3	222 59 27.6	Fifteen (U. S. E.)	250.7	2.399085
	122 46 39.756	861.0	125 53 55.3	305 53 43.3	Fourteen (U. S. E.)	447.2	2.650505
Twelve (U. S. E.), 1899	45 38 35.460	1094.8	55 58 41.2	235 58 29.3	Fourteen (U. S. E.)	433.1	2.636590
	122 46 39.908	864.3	359 37 33.2	179 37 33.3	Thirteen (U. S. E.)	504.6	2.702908
Eleven (U. S. E.), 1899	45 38 25.829	797.4	48 46 36.1	228 46 28.3	Thirteen (U. S. E.)	314.4	2.497511
	122 46 28.837	624.6	141 07 07.1	321 06 59.2	Twelve (U. S. E.)	382.0	2.582027
Ten (U. S. E.), 1899	45 38 43.907	1355.5	3 37 46.3	183 37 45.1	Eleven (U. S. E.)	559.3	2.747607
	122 46 27.202	589.1	46 32 13.3	226 32 04.2	Twelve (U. S. E.)	379.1	2.578768
Nine (U. S. E.), 1899	45 38 40.253	1242.7	51 52 00.8	231 51 42.1	Eleven (U. S. E.)	721.2	2.858030
	122 46 02.645	57.3	101 58 38.8	281 58 21.3	Ten (U. S. E.)	543.6	2.735305
Eight (U. S. E.), 1899	45 38 53.192	1642.2	36 45 20.3	216 45 13.3	Ten (U. S. E.)	357.8	2.553648
	122 46 17.315	374.9	321 30 18.3	141 30 28.8	Nine (U. S. E.)	510.4	2.707903
Six (U. S. E.), 1899	45 39 06.726	207.7	27 55 57.6	207 55 50.3	Eight (U. S. E.)	472.9	2.674794
	122 46 07.085	153.4	353 17 27.6	173 17 30.8	Nine (U. S. E.)	822.9	2.915369

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Seven (U. S. E.), 1899	45 39 03.471	107.2	31 18 11.2	211 17 56.8	Nine (U. S. E.)	838.9	2.923716
	122 45 42.518	920.6	100 42 04.2	280 41 46.6	Six (U. S. E.)	541.4	2.733483
			155 06 04.2	335 05 52.2	Four 2 (U. S. E.)	863.8	2.936394
Four (U. S. E.), 1899	45 39 24.957	770.5	27 23 12.2	207 23 02.6	Six (U. S. E.)	633.9	2.802023
	122 45 53.618	1160.8	340 04 59.3	160 05 07.2	Seven (U. S. E.)	705.6	2.848534
Five (U. S. E.), 1899	45 39 27.181	839.2	44 31 58.0	224 31 34.2	Seven (U. S. E.)	1026.8	3.011505
	122 45 09.260	200.5	85 54 54.0	265 54 22.3	Four (U. S. E.)	962.8	2.983555
			92 43 21.0	272 42 45.2	Four 2 (U. S. E.)	1084.9	3.035405
Thirty-five 2 (U. S. E.), 1913	45 35 06.359	196.3	23 54 54	203 54 49	Thirty-four (U. S. E.)	424.1	2.627453
	122 45 35.241	764.0	97 26 47	277 26 26	Thirty-two (U. S. E.)	641.9	2.807459
Star (U. S. E.), 1913	45 34 59.051	1823.1	74 00 41	254 00 23	Thirty-four (U. S. E.)	588.3	2.769634
	122 45 17.083	370.3	109 49 09	299 48 56	Thirty-five 2 (U. S. E.)	453.7	2.656784
			279 02 12	99 02 16	Thirty-seven (U. S. E.)	446.2	2.649560
Thirty-six 2 (U. S. E.), 1913	45 34 42.879	1323.8	119 15 01	299 14 42	Thirty-four (U. S. E.)	690.2	2.838953
	122 45 15.396	333.8	175 48 37	355 48 36	Star (U. S. E.)	500.6	2.699513
			223 16 34	43 16 47	Thirty-seven (U. S. E.)	589.5	2.770491
Twenty-six 2 (U. S. E.), 1913	45 36 07.968	246.0	244 56 18	64 56 45	Twenty-seven (U. S. E.)	898.8	2.953687
	122 47 03.762	81.5	295 57 50	115 58 24	Twenty-nine (U. S. E.)	1147.2	3.059654
Twenty-four 2 (U. S. E.), 1913	45 36 36.714	1133.5	207 26 26	27 26 39	Twenty-three (U. S. E.)	830.0	2.919066
	122 47 20.617	446.8	278 47 31	98 48 00	Twenty-five (U. S. E.)	897.6	2.953076
Nineteen 2 (U. S. E.), 1913	45 37 50.864	1570.3	55 16 46	235 16 21	Twenty (U. S. E.)	928.0	2.967571
	122 47 02.535	54.9	133 29 09	313 28 51	Eighteen (U. S. E.)	761.0	2.881381
Seventeen 2 (U. S. E.), 1913	45 38 04.426	136.6	98 17 20	278 16 57	Eighteen (U. S. E.)	728.4	2.862393
	122 47 54.747	1185.5	176 59 33	356 59 32	Fourteen (U. S. E.)	716.8	2.855392
Thirteen 2 (U. S. E.), 1913	45 38 18.577	573.5	126 02 17	306 02 04	Fourteen (U. S. E.)	474.1	2.675874
	122 46 38.781	839.9	177 19 09	357 19 08	Twelve (U. S. E.)	521.8	2.717521
Supplementary points.							
Jetty A, target, 1909	46 12 35.051	1082.3	139 19 50.2	319 16 13.2	Battery	9873.5	3.994472
	123 57 51.323	1100.2	214 41 41.9	34 43 47.7	Scarboro Hill 2	6555.4	3.816601
			274 30 32.6	94 31 05.6	Fort Stevens wharf Lighthouse.	984.0	2.993009
Jetty B, target, 1909	46 13 27.034	834.7	150 15 03.5	330 13 10.1	Battery	6774.2	3.830857
	124 00 14.857	318.4	240 54 11.4	60 58 00.9	Scarboro Hill 2	7788.5	3.891454
			326 20 47.2	146 22 03.1	Point Adams Lighthouse (unused).	4066.6	3.609233
Jetty C, 1909	46 13 40.257	1243.1	246 20 14.5	66 24 34.6	Scarboro Hill 2	8422.2	3.925425
	124 00 57.274	1227.4	292 48 14.1	112 51 01.3	Fort Stevens wharf Lighthouse.	5388.6	3.731472
			320 10 23.9	140 12 10.4	Point Adams Lighthouse. (unused).	4938.8	3.693623
Jetty E, 1909	46 14 01.103	34.1	174 15 18.7	354 15 02.3	Battery	4852.9	3.686004
	124 02 29.165	624.9	254 12 07.7	74 17 34.2	Scarboro Hill 2	10062.2	4.002695
			310 49 34.6	130 52 27.4	Point Adams Lighthouse (unused).	6784.2	3.831496
Jetty D,[1] 1909	46 13 42.65	1316.9	247 20 14	67 24 41	Scarboro Hill 2	8581.5	3.933565
	124 01 06.84	146.6	318 56 31	138 58 25	Point Adams Lighthouse (unused).	5128.1	3.709957
Jetty F,[1] 1909	46 13 59.92	1850.1	177 23 54	357 23 47	Battery	4870.1	3.687539
	124 02 41.53	889.9	309 10 15	129 13 17	Point Adams Lighthouse (unused).	6963.6	3.842836
West end of jetty, 1909	46 14 03.483	107.5	204 56 35.4	24 57 50.0	Battery	5244.7	3.719719
	124 04 35.155	753.3	257 49 35.5	77 56 33.0	Scarboro Hill 2	12665.5	4.102621
			299 54 08.1	119 58 31.9	Point Adams Lighthouse (unused).	9038.4	3.956092
Navy east wireless, 1909–1911	46 17 55.874	1725.2	319 47 29.2	139 48 38.3	Battery	3168.8	3.500900
	124 04 27.399	586.4	320 24 41.7	140 41 33.4	Saddle Mountain 2	47404.2	4.675817
			105 32 06.6	285 31 59.2	North Head Lighthouse	228.4	2.358693
Cape Disappointment Astronomic, 1851–1874.	46 16 37.440	1156.0	282 58 50.1	103 04 27.0	Scarboro Hill	10250.2	4.010731
	124 02 51.764	1108.4	319 07 34.7	139 11 15.1	Point Adams	9993.3	3.999707
Jetty Sands Range rear light, May, 1913.	46 13 42.284	1305.6	146 42 03	326 39 57	East Battery	6792.1	3.832007
	123 59 45.385	972.6	212 49 39	32 50 56	Island (U. S. E.)	4241.0	3.627470
			310 35 08	130 36 38	Fort Stevens Longitude	3543.5	3.549437
St. Mary's Church, McGowans, 1913	46 14 49.974	1543.1	42 19 49	222 17 33	Fort Stevens Longitude	5944.6	3.774119
	123 54 33.121	709.5	55 27 51	235 25 54	Desdemona Sands light	4219.3	3.625242
			108 34 33	288 32 05	Island (U. S. E.)	4629.8	3.665568
Fort Columbia wharf light, May, 1913.	46 14 46.835	1446.2	34 47 06	214 45 26	Fort Stevens Longitude	5233.6	3.718801
	123 55 20.576	440.8	46 57 55	226 56 32	Desdemona Sands light	3363.8	3.526832
			111 26 08	291 20 51	East Battery	10096.8	4.004185
Jetty Sands Range front light, May, 1913.	46 13 50.899	1571.6	217 55 23	37 56 50	Island (U. S. E.)	4180.7	3.621245
	123 59 58.009	1243.0	279 15 09	99 17 06	Desdemona Sands light	3532.7	3.548112
			310 57 48	130 59 28	Fort Stevens Longitude	3922.1	3.593524

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Columbia River Entrance Range front light, May, 1913.	46 15 37.177	1147.9	357 32 48.6	177 32 57.0	Fort Stevens Longitude	5858.8	3.767810
	123 57 51.551	1104.1	96 30 29.5	276 30 24.8	Island	139.8	2.145426
			109 04 07.4	289 00 39.3	East Battery	6524.1	3.814522
Sand Island light, May, 1913	46 15 36.310	1121.2	114 15 20	294 15 17	Island	103.7	2.015988
	123 57 53.619	1148.4	238 50 12	58 50 13	Columbia River Entrance Range front light.	51.7	1.713910
Fort Stevens wireless, north pole, 1913.	46 11 27.457	847.8	155 10 17	335 09 08	Jetty Sands Range front light	4880.5	3.688465
	123 58 22.371	479.7	183 51 33	3 51 51	Island	7743.9	3.888957
			200 25 17	20 26 06	Desdemona Sands light	4119.0	3.614795
Fort Stevens, highest water tank, 1913.	46 11 52.089	1608.4	176 25 31	356 25 16	Island	6979.4	3.843816
	123 57 37.716	808.6	188 48 27	8 48 43	Desdemona Sands light	3136.4	3.496438
			258 15 30	78 19 01	Sands	6598.2	3.819425
Columbia River Entrance Range, rear light, May, 1913.	46 15 51.693	1596.2	18 39 42.3	198 38 30.5	Fort Stevens Longitude	6651.0	3.822884
	123 56 00.580	12.4	80 15 32.0	260 14 07.1	Island (U. S. E.)	2552.3	3.406938
			101 09 57.8	281 05 09.5	East Battery	8706.8	3.939858
Republic Spit Range, front light. May, 1913.	46 15 53.631	1656.0	277 31 23	97 33 28	Island (U. S. E.)	3750.8	3.574128
	124 00 51.661	1106.3	327 07 01	147 09 19	Fort Stevens Longitude	7573.6	3.879300
			125 03 13	305 01 55	East Battery	2821.9	3.450538
Republic Spit Range, rear light, May, 1913.	46 15 58.553	1808.0	121 32 12	301 30 52	East Battery	2808.1	3.448415
	124 00 47.768	1022.9	280 01 56	100 03 59	Island (U. S. E.)	3691.6	3.567219
			328 15 31	148 17 47	Fort Stevens Longitude	7657.5	3.884085
Chinook Church spire, 1913	46 16 25.131	776.0	47 45 10	227 44 15	Island (U. S. E.)	2178.4	3.338138
	123 56 42.741	915.2	94 52 54	274 48 36	East Battery	7667.1	3.884632
			7 27 30	187 27 06	Desdemona Sands light	5376.6	3.730507
Peacock Spit Range, front light, May, 1913.	46 15 49.201	1519.5	118 11 10	298 09 20	East Battery	3721.8	3.570751
	124 00 06.335	135.7	277 21 27	97 23 00	Island (U. S. E.)	2770.6	3.442579
			319 01 43	139 03 47	Desdemona Sands light	5590.0	3.747410
Peacock Spit Range, rear light, May, 1913.	46 15 50.368	1555.3	116 58 02	296 56 08	East Battery	3797.2	3.579464
	124 00 01.483	31.7	278 24 37	98 26 06	Island (U. S. E.)	2672.6	3.426941
			334 07 33	154 09 15	Fort Stevens Longitude	6957.5	3.842451
Taylor School, cupola, 1909	46 11 15.930	491.9	106 26 09.4	286 21 38.8	Fort Stevens wharf light	8379.2	3.923200
	123 50 50.663	1086.5	122 47 30.6	302 38 49.9	Battery	18368.2	4.264066
			146 01 44.8	325 58 46.9	Scarboro Hill 2	9446.2	3.975258
Astoria, Smith Point, iron chimney, 1909.	46 10 51.011	1575.1	113 37 36.5	293 33 34.9	Fort Stevens wharf light	7832.6	3.893905
	123 51 30.814	660.9	126 18 37.9	306 10 26.2	Battery	18095.2	4.257563
			152 48 53.7	332 46 24.8	Scarboro Hill 2	9670.9	3.985469
Youngs Bay Bridge, center draw, 1909.	46 10 35.055	1082.4	119 02 33.2	298 58 53.0	Fort Stevens wharf light	7479.7	3.873892
	123 52 00.522	11.2	128 47 06.7	308 39 16.4	Battery	17890.1	4.252613
			157 25 13.4	337 23 05.9	Scarboro Hill 2	9849.9	3.993432
Adair School, cupola, 1909	46 11 33.262	1027.1	99 06 57.7	279 00 31.4	Fort Stevens wharf light	11620.8	4.065236
	123 48 10.320	221.3	116 31 46.6	296 21 10.0	Battery	21095.4	4.324188
			129 58 09.9	309 53 16.2	Scarboro Hill 2	11368.3	4.055694
Astoria Court House, dome,[1] 1909	46 11 20.61	636.2	120 46 19	300 37 03	Battery	19167.1	4.282556
	123 50 02.67	57.3	140 38 56	320 35 23	Scarboro Hill 2	9945.4	3.997624
Point Adams Life Saving Station, flagpole,[1] 1913.	46 12 02.10	64.8	166 54 48	346 54 26	Desdemona Sands Lighthouse	2864.8	3.457100
	123 56 45.04	965.7	259 02 09	79 05 08	Sands	5430.1	3.734805
Flavels Wharf, post light, May, 1913	46 11 37.265	1150.6	147 05 30	327 04 12	Desdemona Sands Lighthouse	4237.5	3.627111
	123 55 27.879	597.8	217 11 41	37 13 58	Point Ellice (U. S. E.)	6739.8	3.828649
			243 56 17	63 58 20	Sands	4093.1	3.612053
Lower Sands light, May, 1913	46 11 34.563	1067.2	124 22 47	304 19 48	Desdemona Sands Lighthouse	6451.3	3.809647
	123 53 06.861	147.1	190 56 06	10 56 42	Point Ellice (U. S. E.)	5551.9	3.744438
			199 10 24	19 10 46	Sands	1991.1	3.299098
Meglers water tank, spindle, 1913	46 15 04.275	132.0	249 05 05	69 08 48	Grays (U. S. E.)	7083.5	3.850245
	123 51 19.925	426.8	299 15 01	119 19 14	Tongue (U. S. E.)	8614.8	3.935246
			50 23 58	230 23 16	Point Ellice (U. S. E.)	1606.5	3.205890
Knapton Channel light, May, 1913	46 14 16.716	516.1	96 29 40	276 27 28	Point Ellice (U. S. E.)	3938.9	3.595378
	123 49 15.029	322.0	224 37 19	44 39 32	Grays (U. S. E.)	5612.6	3.749167
			296 50 38	116 52 10	Taylor	3061.9	3.485989
United States Quarantine Station, flagpole, 1913.	46 16 07.289	225.1	262 41 35	82 43 08	Grays (U. S. E.)	4559.0	3.658985
	123 49 42.084	901.2	318 39 54	138 41 57	Tongue (U. S. E.)	8202.4	3.913941
			325 23 35	145 24 27	Taylor	5828.7	3.765570
Knapton Saw Mill, cupola with flagpole, 1913.	46 16 22.148	683.9	326 25 22	146 27 50	Tongue (U. S. E.)	7942.1	3.899938
	123 48 54.190	1160.4	336 29 57	156 31 14	Taylor	5731.1	3.758238
			34 14 26	214 11 46	Sands	8464.1	3.927582
Grays Point light, May, 1913	46 16 26.100	805.9	354 32 54	174 33 16	Tongue (U. S. E.)	6771.1	3.830660
	123 45 59.283	1269.3	15 13 06	195 12 17	Taylor	5573.4	3.746123
			89 41 13	269 41 05	Grays (U. S. E.)	248.8	2.3958n5
Smith Point light, May, 1913	46 11 34.055	1051.5	128 15 33	308 14 11	Sands	3063.2	3.486175
	123 50 44.151	946.7	159 51 59	339 50 51	Point Ellice (U. S. E.)	5822.8	3.765130
			231 53 28	51 56 04	Taylor	5899.4	3.770810

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Finnish Lutheran Church spire, 1913..	46 11 17.294	534.0	136 06 59	316 05 40	Sands	3349.7	3.525002
	123 50 48.037	1030.2	162 12 12	342 11 07	Point Ellice (U. S. E.)	6285.2	3.798320
			228 39 00	48 41 39	Taylor	6294.5	3.798958
Weather Bureau Tower, flagpole,[1] 1913.	46 11 26.87	829.7	121 23 49	301 21 52	Sands	4067.7	3.609350
	123 49 54.38	1166.1	151 38 39	331 36 55	Point Ellice (U. S. E.)	6464.9	3.810563
Astoria Rear Range light, May, 1913..	46 11 04.059	125.3	155 39 35	335 37 58	Point Ellice (U. S. E.)	7017.2	3.846165
	123 50 02.708	58.1	206 31 29	26 34 17	Grays (U. S. E.)	11114.0	4.045870
			219 25 15	39 27 22	Taylor	5911.3	3.771680
Astoria Front Range light, May, 1913.	46 11 22.276	687.8	148 52 38	328 50 39	Point Ellice (U. S. E.)	6811.8	3.833263
	123 49 33.363	715.4	204 48 06	24 50 32	Grays (U. S. E.)	10334.3	4.014282
			217 58 20	38 00 05	Taylor	5078.7	3.705756
McClure's School cupola, flagpole, 1913.	46 11 14.427	445.5	154 42 03	334 40 26	Point Ellice (U. S. E.)	6717.6	3.827217
	123 50 03.706	79.5	207 22 55	27 25 43	Grays (U. S. E.)	10838.3	4.034962
			221 38 18	41 40 25	Taylor	5681.8	3.754487
Alderbrook School, cupola, 1913	46 11 40.413	1247.8	102 58 23	282 54 14	Sands	7592.7	3.880396
	123 46 51.206	1097.9	127 01 01	306 57 05	Point Ellice (U. S. E.)	8760.6	3.942533
			185 35 18	5 35 47	Grays (U. S. E.)	8861.8	3.947522
Buoy Depot flag, 1913	46 12 29.877	922.5	91 13 19	271 08 38	Sands	8368.3	3.922635
	123 46 06.072	130.2	115 12 35	295 08 07	Point Ellice (U. S. E.)	8800.1	3.944486
			179 11 14	359 11 11	Grays (U. S. E.)	7293.1	3.862913
Marconi northeast wireless, tallest pole, Astoria, 1913.	46 11 05.932	183.2	106 02 30.0	285 57 34.0	Fort Stevens Longitude	9148.0	3.961328
	123 50 49.740	1066.7	124 41 55.0	304 33 22.4	East Battery	18484.2	4.266800
			146 56 59.5	326 54 00.9	Scarboro Hill 2	9714.5	3.987422
Marconi southwest wireless, Astoria, 1913.	46 11 05.277	162.9	106 15 40.9	286 10 46.8	Fort Stevens Longitude	9099.5	3.959018
	123 50 52.368	1123.1	124 50 57.3	304 42 26.6	East Battery	18449.4	4.265983
			147 17 36.4	327 14 39.7	Scarboro Hill 2	9700.9	3.986812
Post light, Sand Island,[1] 1913	46 15 43.81	1352.8	275 37 08	95 39 38	Scarboro Hill 2	4472.1	3.650512
	123 58 24.90	533.2	350 56 32	170 57 05	Fort Stevens Longitude	6134.7	3.787790
Navy west wireless, Astoria,[1] 1913	46 17 56.066	1731.2	290 04 02.9	110 10 59.5	Scarboro Hill 2	13145.8	4.118787
	124 04 33.618	719.5	318 48 32.2	138 53 31.2	Fort Stevens Longitude	13468.7	4.129326
Gun (U. S. E.), 1905	46 12 26.964	832.6	211 51 56.3	31 53 54.5	Scarboro Hill 2 (U. S. E.)	6640.2	3.822178
	123 57 40.778	874.1	225 18 19.1	45 18 19.8	Fort Stevens Longitude	27.90	1.445604
Smith (U. S. E.), 1905	46 11 24.491	756.2	101 50 43.5	281 45 32.8	Gun (U. S. E.)	9430.7	3.974546
	123 50 30.231	648.3	142 56 40.3	322 53 27.6	Scarboro Hill 2 (U. S. E.)	9485.6	3.977064
			248 14 13.8	68 17 51.0	Tongue (U. S. E.)	6946.3	3.841753
Old Point Ellice (U. S. E.), 1905	46 14 30.406	938.8	245 37 14.0	65 41 40.1	Grays (U. S. E.)	8663.1	3.937671
	123 52 19.417	416.0	289 46 53.7	109 51 49.8	Tongue (U. S. E.)	9343.0	3.970485
			337 48 30.3	157 49 49.1	Smith (U. S. E.)	6199.1	3.792328
			61 04 16.7	241 00 24.7	Gun (U. S. E.)	7871.4	3.896052
Seal (U. S. E.), 1905	46 12 01.511	46.7	98 30 25.3	278 25 01.9	Tongue (U. S. E.)	9711.1	3.987270
	123 38 01.215	26.0	160 29 48.7	340 28 19.5	Harrington (U. S. E.)	7922.8	3.898878
Elliott (U. S. E.), 1905	46 15 38.376	1184.9	14 17 44.8	194 16 47.3	Seal (U. S. E.)	6909.7	3.839402
	123 36 41.636	891.7	65 04 21.7	244 58 00.6	Tongue (U. S. E.)	12471.9	4.095934
			96 56 34.5	276 49 48.3	Grays (U. S. E.)	12279.3	4.089172
Marsh (U. S. E.), 1905	46 13 52.180	1611.1	57 48 13.1	237 45 10.5	Seal (U. S. E.)	6408.6	3.806763
	123 33 48.276	1034.5	131 27 31.4	311 25 26.2	Elliott (U. S. E.)	4954.2	3.694976
			262 28 19.3	82 30 30.3	Raspberry (U. S. E.)	3920.1	3.593299
Old Jim Crow (U. S. E.), 1905	46 15 40.385	1247.0	258 12 06.6	78 14 01.5	Three Tree Point (U. S. E.)	3481.0	3.541710
	123 33 48.827	1045.7	305 57 15.7	125 59 27.1	Raspberry (U. S. E.)	4815.6	3.682648
			359 17 51.2	179 47 51.6	Marsh (U. S. E.)	3341.0	3.523879
			89 03 25.6	269 01 20.8	Elliott (U. S. E.)	3701.6	3.568385
Astoria (U. S. E.),[1] 1905	46 11 17.17	530.2	158 18 48	338 17 28	Old Point Ellice (U. S. E.)	6421.5	3.807639
	123 50 28.66	614.6	210 03 01	30 06 07	Grays (U. S. E.)	11021.3	4.042232
Dot (U. S. E.),[1] 1905	46 11 01.16	35.8	206 46 52	26 49 43	Grays (U. S. E.)	11239.3	4.050740
	123 50 07.42	159.1	234 05 36	54 12 52	Harrington (U. S. E.)	15933.9	4.202322
Alderbrook (U. S. E.),[1] 1905	46 11 41.71	1287.9	128 23 05	308 19 23	Old Point Ellice (U. S. E.)	8394.3	3.923986
	123 47 12.29	263.5	188 30 53	8 31 37	Grays (U. S. E.)	8877.6	3.948298
Old Tongue (U. S. E.),[1] 1905	46 12 48.09	1484.9	171 34 15	351 33 41	Grays (U. S. E.)	6903.7	3.832746
	123 45 24.32	521.3	228 36 03	48 39 54	Harrington (U. S. E.)	9123.6	3.960164
Bear (U. S. E.),[1] 1905	46 10 31.76	980.6	147 08 11	327 04 12	Grays (U. S. E.)	13028.4	4.114891
	123 40 40.72	873.4	184 18 16	4 18 42	Harrington (U. S. E.)	10267.8	4.011476
Lower Gauge Pile light, May, 1913	46 13 05.413	167.1	110 17 57	290 13 55	Point Ellice (U. S. E.)	7638.8	3.883024
	123 46 43.298	928.0	186 23 19	6 23 42	Grays (U. S. E.)	6233.9	3.794760
			288 55 02	108 55 55	Tongue (U. S. E.)	1677.4	3.224631
Gauge Pile, 1913	46 13 22.727	701.7	181 27 59	1 28 04	Grays (U. S. E.)	5662.4	3.753002
	123 46 17.671	378.7	238 07 46	58 12 16	Harrington (U. S. E.)	9403.8	3.973305
			316 06 45	136 07 20	Tongue (U. S. E.)	1496.5	3.175071

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Taylor Sands light, May, 1913	46 13 51.065	1576.7	356 16 31	176 16 35	Tongue (U. S. E.)	1957.7	3.291755
	123 45 35.205	754.4	170 55 32	350 55 06	Grays (U. S. E.)	4846.3	3.685409
			239 58 47	60 02 46	Harrington (U. S. E.)	8173.2	3.912394
Pulliam's Fish House, southeast corner, 1913.	46 13 23.940	739.2	53 14 02	233 13 11	Tongue (U. S. E.)	1864.2	3.270497
	123 44 19.603	420.1	157 02 03	337 00 42	Grays (U. S. E.)	6107.7	3.785879
			227 56 16	47 59 20	Harrington (U. S. E.)	7351.4	3.866371
Megler's Fish House, flag, south gable, 1913.	46 12 17.176	530.3	190 31 36	10 32 20	Harrington (U. S. E.)	7103.7	3.851483
	123 41 05.339	114.5	249 56 32	70 00 29	Wharf	7495.9	3.874823
			254 10 43	74 12 46	Water	3797.9	3.579545
Beacon No. 1, May, 1913	46 13 56.026	1729.9	43 43 50	223 42 42	Tongue (U. S. E.)	2915.0	3.464641
	123 43 55.267	1184.3	147 55 08	327 53 30	Grays (U. S. E.)	5468.1	3.737837
			231 26 59	51 29 46	Harrington (U. S. E.)	6312.4	3.800192
Tongue Point Neck, 1851	46 12 18.831	581.4	75 03 28.1	255 00 17.3	Astor Point	5866.0	3.768344
	123 45 58.357	1251.1	116 33 21.4	296 28 46.5	Point Ellice	9116.9	3.959848
			180 48 40.8	0 48 44.5	Grays Point	7673.2	3.884979
Shortis chimney,[1] 1852–85	46 11 49.08	1515.4	126 03 02	305 59 11	Point Ellice	8484.0	3.928600
	123 46 58.84	1261.6	189 16 46	9 17 33	Grays Point	8705.0	3.939771
Yellow Bluff, 1851	46 16 33.154	1023.7	41 07 13.6	221 03 49.4	Tongue Point	9211.6	3.964337
	123 40 41.884	896.8	88 29 02.3	268 25 17.3	Grays Point	6669.9	3.824118
John Day Point,[1] 1852	46 10 54.14	1671.7	168 53 15	348 52 07	Grays Point	10484.2	4.020537
	123 44 18.91	405.6	228 05 02	48 10 32	Rocky Point	13145.5	4.118776
Settlers Point, 1852	46 10 32.521	1004.1	123 54 14.0	303 50 43.8	Tongue Point	7522.1	3.876341
	123 40 33.244	713.0	147 58 56.0	327 55 04.9	Grays Point	12924.9	4.111427
			207 39 23.5	27 42 10.3	Rocky Point	10661.6	4.027823
Grays Bay, 1852	46 17 20.120	621.2	290 59 08.5	111 01 16.0	Yellow Bluff	4046.0	3.607022
	123 43 38.316	820.2	15 10 28.6	195 09 11.9	Tongue Point	8695.3	3.939286
Grays River,[1] 1852	46 17 55.457	1712.3	344 06 42.0	164 07 06.4	Yellow Bluff	2642.1	3.421957
	123 41 15.667	335.3	70 21 00.1	250 19 17.0	Grays Bay	3242.4	3.510953
Beacon No. 2, May, 1913	46 14 03.549	109.6	54 57 35	234 55 42	Tongue (U. S. E.)	4072.3	3.609842
	123 42 53.726	1151.3	136 11 37	316 09 14	Grays (U. S. E.)	6099.0	3.785252
			224 21 35	44 23 37	Harrington (U. S. E.)	5176.0	3.713991
Beacon No. 4, May, 1913	46 14 44.729	1381.1	55 00 41	234 57 47	Tongue (U. S. E.)	6292.8	3.798841
	123 41 28.762	616.2	117 24 05	297 20 41	Grays (U. S. E.)	6804.6	3.832802
			216 32 18	36 33 19	Harrington (U. S. E.)	3022.3	3.480342
Scappoose Johnson Fish House, flag, northwest gable, 1913.	46 14 42.152	1301.5	117 35 12	297 31 44	Grays (U. S. E.)	6934.5	3.841015
	123 41 23.859	511.1	214 02 38	34 03 35	Harrington (U. S. E.)	3026.6	3.480957
			310 20 32	130 22 48	Water	5314.9	3.725498
Grays Bay light, May, 1913	46 16 03.699	114.2	20 58 50	200 57 32	Tongue (U. S. E.)	6477.9	3.811433
	123 43 41.067	879.4	102 09 26	282 07 38	Grays (U. S. E.)	3281.9	3.516120
			270 06 18	90 08 55	Harrington (U. S. E.)	4632.6	3.665826
Rocky Point light, May, 1913	46 17 20.315	627.3	303 19 11	123 24 59	Wharf	12350.7	4.091692
	123 43 38.352	821.0	320 11 51	140 15 45	Water	10831.8	4.034701
			15 46 45	195 45 25	Tongue (U. S. E.)	8743.5	3.941687
Pile, Grays Bay, 1913	46 16 34.484	1064.8	28 58 11	208 56 00	Tongue (U. S. E.)	7999.0	3.903038
	123 42 28.528	610.8	46 42 14	226 38 52	Taylor	8215.8	3.914648
			73 15 37	253 08 31	Point Ellice (U. S. E.)	13181.2	4.119955
Alamicut Point,[1] 1852	46 18 05.26	162.4	316 00 56	136 02 29	Yellow Bluff	3951.9	3.596801
	123 42 50.06	1071.4	36 32 28	216 31 53	Grays Bay	1734.9	3.239264
Altoona Cannery, main building, south gable, 1913.	46 15 57.785	1784.2	311 56 50	131 59 29	Wharf	6347.5	3.802603
	123 39 17.060	365.3	347 00 23	167 01 08	Water	5928.9	3.772976
			99 35 15	279 34 41	Harrington (U. S. E.)	1035.4	3.015102
Harrington Point Rear Range light,[1] April, 1913.	46 16 02.64	81.5	53 18 14	233 13 42	Tongue (U. S. E.)	10058.8	4.002547
	123 39 13.01	278.6	80 32 00	260 22 33	Point Ellice (U. S. E.)	17043.5	4.231560
Klevenhausen store, flag pole, 1913	46 15 56.019	1729.7	312 59 40	133 02 11	Wharf	6142.3	3.788332
	123 39 06.402	137.1	349 04 30	169 05 07	Water	5828.3	3.765539
			100 18 01	280 17 19	Harrington (U. S. E.)	1269.6	3.103678
Miller Sands Fish House, flag pole, 1913.	46 15 24.974	771.1	265 51 04	85 54 40	Jim Crow (U. S. E.)	6410.0	3.806859
	123 38 47.000	1006.7	308 23 31	128 25 49	Wharf	5201.5	3.716128
			351 46 26	171 46 49	Water	4813.6	3.682473
			60 39 32	240 34 42	Tongue (U. S. E.)	9891.8	3.995276
Fish House, leaning stack, 1913	46 13 45.824	1414.9	46 40 31	226 39 30	Water	2481.3	3.394673
	123 36 50.659	1085.6	183 02 12	3 02 18	Rocky Point 2	3481.1	3.541717
			276 07 46	96 08 39	Wharf	1592.8	3.202158
Fish House, west barrel, 1913	46 14 23.355	721.1	172 25 53	352 25 42	Rocky Point 2	2337.8	3.368799
	123 36 27.671	592.9	235 15 47	55 17 42	Jim Crow (U. S. E.)	4148.6	3.617903
			320 36 55	140 37 32	Wharf	1719.5	3.235405

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Fish House, Stack, 1913	46 14 40.954	1264.5	51 56 35	231 55 15	Wharf	3036.8	3.482422
	123 33 45.174	967.8	59 31 19	239 28 05	Water	6707.8	3.826581
			177 46 02	357 46 00	Jim Crow (U. S. E.)	1821.0	3.260299
Brookfield Cannery, 1913	46 15 52.754	1628.9	267 11 18	87 15 33	Lower Skumaque	7586.1	3.880018
	123 33 34.011	728.3	263 54 38	83 56 22	Three Tree Point (U. S. E.)	3107.7	3.492446
			32 45 14	212 43 45	Wharf	4861.9	3.686807
Three Tree Point light,[1] June, 1913	46 16 03.26	100.7	223 39 50	43 39 50	Three Tree Point (U. S. E.)	6.32	0.800717
	123 31 09.91	212.2					
Bay View light, May, 1913	46 16 26.986	833.2	293 14 54	113 15 48	Lower Skumaque	1746.4	3.242140
	123 28 55.116	1180.1	29 18 20	209 16 59	Raspberry (U. S. E.)	4893.3	3.689602
			75 50 07	255 48 30	Three Tree Point (U. S. E.)	2972.5	3.473119
Bay View light (new), July, 1913	46 16 27.708	855.5	305 32 16	125 33 48	Stump	3342.1	3.524016
	123 28 55.324	1184.5	317 39 53	137 42 29	Dike	6851.7	3.835801
			75 23 53	255 22 16	Three Tree Point (U. S. E.)	2973.7	3.473297
Stack Fish House, 1913	46 15 52.186	1611.3	30 35 40	210 34 36	Raspberry (U. S. E.)	3709.1	3.569265
	123 29 18.795	402.5	98 18 36	278 17 16	Three Tree Point (U. S. E.)	2400.2	3.380255
			259 39 30	79 40 41	Lower Skumaque	2146.5	3.331734
Skumaque School, square cupola, 1913	46 16 14.956	461.8	338 41 34	158 43 02	Pole	7183.9	3.856361
	123 27 16.960	363.2	82 40 49	262 36 06	Jim Crow (U. S. E.)	8454.2	3.927070
			85 55 50	265 53 02	Three Tree Point (U. S. E.)	4996.7	3.698680
Hunting Island Rear Range light,[1] June, 1913.	46 13 45.15	1394.1	58 25 57	238 25 54	Dike	90.5	1.956649
	123 25 16.39	351.2					
Pillar Rock Cannery, flagpole, 1913	46 15 38.839	1199.2	9 47 11	189 46 50	Wharf	3713.8	3.569820
	123 35 07.301	156.4	89 38 01	269 36 53	Rocky Point 2	2029.3	3.307338
			268 53 47	88 54 44	Jim Crow (U. S. E.)	1688.3	3.227440
Pillar Rock, 1913	46 15 30.815	951.5	96 50 32	276 49 26	Rocky Point 2	1970.6	3.294600
	123 35 10.693	229.0	260 57 16	80 58 15	Jim Crow (U. S. E.)	1782.8	3.251100
			9 17 50	189 17 31	Wharf	3457.4	3.538754
Pillar Rock Channel Front Range light, May, 1913.	46 15 38.798	1198.0	10 08 42	190 08 20	Wharf	3716.6	3.570147
	123 35 06.210	133.0	37 55 36	217 53 20	Water	6579.2	3.818174
			89 40 24	269 39 15	Rocky Point 2	2052.6	3.312309
Pillar Rock Channel Rear Range light,[1] May, 1913.	46 15 38.93	1202.0	80 24 24	260 24 16	Pillar Rock Channel Front Range light.	251.7	2.400840
	123 34 54.62	1169.8					
Jim Crow Point light,[1] June, 1913	46 15 39.97	1234.1	3 55 41	183 55 41	Jim Crow (U. S. E.)	2.6	0.414973
	123 33 48.48	1038.3					
Elliott Point light,[1] May, 1913	46 15 38.53	1189.7	274 43 18	94 43 20	Rocky Point 2	45.24	1.655523
	123 36 44.15	945.5					
Tongue Point light,[1] May, 1913	46 12 29.88	922.6	89 00 35	269 00 35	Buoy Depot flag	5.2	0.716003
	123 46 05.83	125.0					
Oil Works Stack, western one, 1913	46 10 51.824	1600.2	137 28 39	317 26 06	Desdemona Sands Lighthouse	6732.4	3.828170
	123 53 42.981	921.9	195 06 02	15 07 03	Point Ellice (U. S. E.)	7013.0	3.845801
			204 02 58	24 03 46	Sands	3504.6	3.544640
			239 42 56	59 47 42	Taylor	9813.5	3.991824
Welch,[1] 1871	46 15 18.25	563.5	108 59 10	288 56 53	Three Tree Point	4314.8	3.634963
	123 27 59.31	1270.3	211 30 19	31 30 58	Skumaquea	2196.7	3.341774
Welch's Fish House, northeast gable,[1] 1871.	46 15 05.43	167.7	112 03 28	292 00 58	Three Tree Point	4792.9	3.680599
	123 27 42.41	908.5	199 06 29	19 06 55	Skumaquea	2401.0	3.380397
Puget, 1871	46 12 23.484	725.1	35 36 01.3	215 35 28.8	Hunts Mill Point	1661.7	3.220553
	123 25 17.872	383.1	212 24 10.6	32 25 35.7	Lokamin	4709.3	3.672954
			284 25 11.0	104 26 58.8	Birnie	3306.1	3.519315
Birnie's House, northwest gable, 1871	46 12 02.699	83.3	312 56 41.4	132 56 53.0	Point Basalt	470.8	2.672806
	123 22 57.812	1239.5	312 30 33.8	132 30 40.5	Birnie	269.9	2.431171
			79 53 15.8	259 51 02.2	Hunts Mill Point	4033.2	3.605654
Point Basalt, 1871	46 11 52.311	1615.2	0 39 18.8	180 39 16.0	Westport	7281.7	3.862235
	123 22 41.741	894.9	84 52 21.8	264 49 56.6	Hunts Mill Point	4332.5	3.636742
			133 31 58.4	313 31 53.5	Birnie	200.9	2.302934
			312 58 59.0	133 01 10.8	Anderson	5353.5	3.728639
Tenasillikee,[1] 1871	46 14 05.816	179.6	75 27 40.2	255 25 41.5	Quinn	3640.0	3.561106
	123 26 10.300	220.7	163 53 55.0	343 53 15.0	Skumaquea	4277.3	3.631168
Snag (U. S. E.),[1] 1905	46 13 59.06	1823.6	201 07 43	21 08 23	Elliott (U. S. E.)	3287.8	3.516904
	123 37 36.97	792.2	237 21 06	57 23 51	Old Jim Crow (U. S. E.)	5803.0	3.763655
Skamokowa (U. S. E.),[1] 1905	46 16 18.54	572.5	48 58 53	228 56 18	Raspberry (U. S. E.)	6102.2	3.785486
	123 27 12.02	257.4	84 46 46	264 43 55	Three Tree Point (U. S. E.)	5111.0	3.708507
Pole, 1913	46 12 38.175	1178.7	153 20 48.6	333 20 13.1	Mud	2346.5	3.370426
	123 25 15.186	325.5	158 47 56.6	338 46 49.3	Stump	5517.8	3.741765
			177 04 55.2	357 04 51.7	Dike	2023.1	3.306018

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Upper Skumaquea light, June, 1913	46 14 50.326	1553.9	338 13 00	158 13 28	Dike	2218.2	3.346002
	123 25 58.405	1251.1	3 38 56	183 38 52	Mud	1987.3	3.298261
			77 11 21	257 10 32	Ten	1489.8	3.173128
Bugby Hole Eccentric, 1913	46 10 31.795	981.7	177 50 58	357 50 48	Upper Skumaquea light	7988.1	3.902444
	123 25 44.413	952.7	185 02 58	5 03 16	Dike	5945.7	3.774204
Bugby Hole Eccentric reference mark,[1] 1913	46 10 30.839	952.2	216 26 22	36 26 23	Bugby Hole Eccentric	36.71	1.56478
	123 25 45.429	974.5					
Chimney House,[1] 1913	46 14 18.59	574.0	170 55 58	350 55 47	Stump	2069.3	3.315828
	123 26 33.12	709.7	304 34 06	124 34 59	Dike	1903.2	3.279488
Chimney House, south end Tenasillihee Island,[1] 1913	46 12 34.75	1073.0	208 59 03	28 59 43	Dike	2430.9	3.385765
	123 26 14.96	320.7	265 16 20	85 17 03	Pole	1285.7	3.109146
Bugby Hole light, June, 1913	46 10 31.938	986.1	177 45 38	357 45 27	Upper Skumaquea light	7984.2	3.902231
	123 25 43.840	940.4	184 56 08	4 56 25	Dike	5940.3	3.773806
Cathlamet light, June, 1913	46 11 54.076	1669.7	114 18 09	294 16 28	Pole	3310.2	3.519858
	123 22 54.449	1167.4	130 22 46	310 20 29	Mud	5340.8	3.727609
Burroughs,[1] 1872	46 10 39.36	1215.3	28 27 22	208 25 51	Westport	5719.1	3.757331
	123 20 38.68	829.6	105 02 01	284 58 07	Hunts Mill Point	7200.5	3.857363
Sandy Point, 1872	46 10 06.929	213.9	138 46 55.2	318 45 19.2	Point Basalt	4326.6	3.636142
	123 20 28.780	617.4	290 28 43.1	110 29 18.9	Anderson	1135.6	3.055224
Mouth,[1] 1872	46 08 40.52	1251.1	354 02 09	174 02 14	Westport	1367.0	3.135769
	123 22 52.24	1121.2	143 32 01	323 29 44	Hunts Mill Point	6881.7	3.837694
Gruber,[1] 1873	46 07 15.85	489.4	119 11 52	299 10 37	Westport	2572.9	3.410431
	123 21 00.99	21.3	199 45 37	19 46 36	Anderson	5190.7	3.715229
Skunk Cabbage Ridge,[1] 1873	46 06 33.28	1027.6	181 16 29	1 16 33	Cape Horn	4839.2	3.684778
	123 17 21.35	458.5	253 25 31	73 27 50	Clatskanie	4320.5	3.635535
Holland, 1873	46 10 14.300	441.5	71 48 26.4	251 46 09.6	Cooper	4281.4	3.631581
	123 12 03.141	67.4	218 14 21.3	38 15 11.8	Abernathy	2426.1	3.384906
Wallaces Island, 1873	46 09 10.177	314.2	107 48 57.6	287 47 50.4	Cooper	2098.7	3.321958
	123 13 39.579	849.3	222 34 10.5	42 36 10.6	Abernathy	5276.9	3.722382
			226 15 12.5	46 16 22.1	Holland	2863.8	3.456936
Eagle Cliff, 1873	46 10 38.921	1201.7	322 43 17.2	142 43 36.7	Holland	955.4	2.980163
	123 12 30.115	645.9	28 32 54.5	208 32 04.4	Wallaces Island	3119.1	3.494031
			58 59 11.7	238 57 14.4	Cooper	4070.4	3.609642
Hapgood House chimney,[1] 1873	46 10 24.06	742.9	278 45 46	98 46 51	Holland	1975.1	3.295591
	123 13 34.14	732.3	2 55 50	182 55 46	Wallaces Island	2284.0	3.358704
G. Hume's house chimney,[1] 1873	46 10 17.93	553.6	272 43 40	92 44 59	Holland	2345.5	3.370239
	123 13 52.36	1123.1	352 32 02	172 32 11	Wallaces Island	2109.8	3.324244
Alder Bluff,[1] 1873	46 11 17.60	543.4	14 13 02	194 12 42	Greens Point	2463.7	3.391594
	123 05 17.70	379.6	93 20 21	273 18 26	Nequally	3418.8	3.533878
Monticello,[1] 1873	46 07 27.39	845.7	4 13 00	184 12 49	Rainier	4192.7	3.622495
	122 55 13.99	300.4	96 47 11	276 44 18	Mount Coffin	5182.2	3.714513
Cowlitz,[1] 1873	46 05 59.22	1828.5	255 04 15	75 06 02	Coweman	3295.4	3.517911
	122 55 05.21	111.9	18 48 27	198 48 10	Rainier	1541.3	3.187884
Mountain top, back of Westport, 1873	46 05 14.633	451.8	240 03 30.2	60 10 34.7	Cape Horn	14584.6	4.163894
	123 27 05.276	113.4	241 46 08.5	61 57 49.3	Abernathy	23663.0	4.374070
			252 12 33.4	72 25 23.2	Bradbury	24072.0	4.381513
			257 33 02.4	77 42 22.1	Clatskanie	17080.3	4.232496
Cottonwood Island,[1] 1873	46 05 18.95	585.1	218 54 25	38 55 21	Coweman	2687.8	3.429401
	122 53 55.55	1193.5	352 38 40	172 38 50	Galloway	2427.9	3.385235
Episcopal Church cross, Kalama,[1] 1873	46 00 38.43	1186.6	37 43 40	217 42 45	Hunter	2699.8	3.431330
	122 50 34.24	736.7	107 53 36	287 52 12	Gobles Point	2636.5	3.421026
Methodist Church spire, Kalama,[1] 1873	46 00 27.57	851.3	44 17 59	224 17 00	Hunter	2514.9	3.400529
	122 50 29.39	632.3	113 40 06	293 38 39	Gobles Point	2853.4	3.455357
Walker Island light, 1913	46 08 57.846	1786.0	290 02 13	110 02 58	Barlow	1402.9	3.147025
	123 02 44.566	956.4	297 36 16	117 38 46	Quarry	4995.0	3.698538
			300 12 31	120 15 49	Slaughter	6816.8	3.833579
Barlow Point Range, front light, 1913	46 08 43.659	1348.0	298 04 50	118 04 53	Barlow	90.9	1.958373
	123 01 46.892	1006.4	33 32 20	213 31 48	Rinearson	1707.8	3.232428
Barlow Point Range, rear light,[1] 1913	46 08 42.06	1298.6	118 40 22	298 40 22	Barlow	13.74	1.13799
	123 01 42.60	914.3					
Walker Island Dike light, 1913	46 08 08.966	276.8	285 31 00	105 32 38	Quarry	3013.6	3.479090
	123 01 33.642	722.2	73 59 47	253 59 06	Rinearson	1277.5	3.106355
			168 45 09	348 46 02	Barlow	1048.5	3.020570

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
La Du light, 1913	46 07 55.865	1724.9	303 35 17	123 35 37	Quarry	727.3	2.861733
	122 59 46.606	1000.4	306 16 03	126 17 11	Slaughter	2567.2	3.409454
			90 51 52	270 49 54	Rinearson	3526.1	3.547296
White Tree, three prongs, 1913	46 07 10.013	309.2	116 21 40	296 20 00	Rinearson	3307.5	3.519500
	123 00 12.792	274.6	145 45 19	325 44 14	Barlow	3446.4	3.537368
			229 03 16	49 03 55	Quarry	1546.4	3.189330
Mount Coffin light,[1] 1913	46 07 42.76	1320.2	113 20	293 20	Quarry	5.3	0.72427
	122 59 18.16	389.9					
Slaughter Island Bar Range, rear light, 1913.	46 07 10.877	335.9	342 45 08	162 45 09	Slaughter	136.0	2.133562
	122 58 12.088	259.5	104 34 11	284 31 04	Rinearson	5739.2	3.758854
			124 44 12	304 43 24	Quarry	1731.9	3.238522
Kelso, school,[1] 1913	46 08 52.82	1631.0	72 09 04	252 05 33	Mount Coffin	6604.8	3.819857
	122 54 20.84	447.3	80 49 59	260 44 06	Rinearson	10654.8	4.027547
Kelso, square tower,[1] 1913	46 08 49.86	1539.6	72 57 05	252 53 33	Mount Coffin	6593.2	3.819095
	122 54 20.07	430.7	81 19 57	261 14 03	Rinearson	10657.1	4.027638
Kelso, white church, red spire,[1] 1913	46 08 33.46	1033.2	74 49 01	254 45 26	Mount Coffin	6625.8	3.821239
	122 54 15.84	340.0	82 27 03	262 21 06	Rinearson	10719.3	4.030168
Bournes House, west gable, 1913	46 05 52.00	1605.5	245 36 11	65 36 51	Hut (U. S. E.)	1296.5	3.112757
	122 57 33.49	719.4	261 59 48	82 00 46	Wood 2 (U. S. E.)	1743.2	3.241356
Beaver Dock Building, north gable, 1913.	46 05 28.50	880.0	240 41 51	60 42 49	Cowlitz 2 (U. S. E.)	1992.4	3.299369
	122 56 04.70	101.0	294 18 21	114 18 58	Bluff (U. S. E.)	1193.5	3.076824
Ranier Mineral Soap factory, 1913	46 05 22.82	704.6	228 51 20	48 52 04	Cowlitz 2 (U. S. E.)	1748.8	3.242729
	122 55 45.12	969.3	295 19 35	115 19 58	Bluff (U. S. E.)	738.0	2.868065
Ranier Church, steeple, 1913	46 05 16.88	521.2	163 41 33	343 41 20	Wood 2 (U. S. E.)	1382.4	3.140646
	122 55 55.05	1182.7	186 28 03	6 28 07	Net 2 (U. S. E.)	1210.2	3.082860
Crib No. 1, 1913	46 05 48.73	1504.6	335 58 43	155 59 00	Bluff (U. S. E.)	1221.7	3.086975
	122 55 37.22	799.5	24 35 28	204 35 16	Ranier 2 (U. S. E.)	847.2	2.928002
Crib No. 4, 1913	46 05 52.42	1618.5	320 00 55	140 01 30	Bluff (U. S. E.)	1604.7	3.205401
	122 56 02.07	44.5	348 24 55	168 25 01	Ranier 2 (U. S. E.)	902.5	2.955444
Cowlitz River light, 1913	46 05 31.944	986.3	305 55 28.1	125 56 38.0	Cottonwood Island	2572.9	3.410428
	122 54 47.682	1024.4	312 22 26.9	132 23 53.6	Cotton	3500.0	3.544070
			335 26 21.5	155 26 44.5	Old	1650.5	3.217606
Crib No. 8, 1913	46 06 03.29	101.6	350 50 00	170 50 04	Dock (U. S. E.)	881.8	2.945353
	122 56 36.59	786.0	24 39 38	204 39 26	Mill (U. S. E.)	871.8	2.940421
Crib No. 11, 1913	46 06 15.65	483.2	38 28 29	218 28 08	Bourne (U. S. E.)	1006.8	3.002925
	122 57 03.53	75.8	78 41 59	258 41 11	Tangent (U. S. E.)	1448.2	3.160838
Schoolhouse, flagpole, 1913	46 05 20.60	636.0	163 42 57	343 42 43	Hut (U. S. E.)	1567.7	3.195253
	122 56 18.06	388.0	184 59 42	4 59 46	Wood 2 (U. S. E.)	1216.5	3.085096
Columbia River Door Co. Dock, water tank, 1913.	46 05 35.84	1106.6	197 12 17	17 12 28	Hut (U. S. E.)	1082.9	3.034575
	122 56 53.44	1148.1	229 25 17	49 25 46	Wood 2 (U. S. E.)	1140.0	3.056894
Bushes Dock, front gable, 1913	46 07 37.86	1169.0	311 44 35	131 45 11	Slaughter 2 (U. S. E.)	1446.2	3.160237
	122 59 00.46	9.9	111 46 02	291 45 49	Quarry (U. S. E.)	414.2	2.617220
Nusoms House, west gable, 1913	46 05 08.83	272.6	194 09 04	14 09 17	Cowlitz 2 (U. S. E.)	1631.9	3.212899
	122 55 02.39	51.4	270 34 19	90 35 24	D 10 (U. S. E.)	1949.7	3.289977
Flagpole, 1913	46 05 37.69	1163.7	277 31 57	97 31 57	Mill (U. S. E.)	14.69	1.167022
	122 56 54.20	1164.4					
Enterprise Landing, rear light,[1] 1913	46 00 09.55	394.9	308 54	128 54	Enterprise Landing, front light	181.6	2.25912
	123 52 27.95	601.4					
Last pile log boom,[1] 1913	46 03 26.24	810.0	68 26 46	248 26 09	Dock	1168.0	3.067458
	122 52 18.36	394.6	192 50 35	12 50 45	Rail	1367.6	3.135959
Cottonwood Island light, lower rear, 1913.	46 03 55.714	1720.2	18 28 18	198 28 03	Dock	1412.1	3.149868
	122 52 48.080	1033.3	102 21 44	282 21 05	Cut	1175.8	3.070338
			245 49 14	65 49 46	Rail	1033.4	3.014280
Cottonwood Island light, upper and lower front, 1913.	46 04 06.366	196.6	84 26 13	264 25 47	Cut	796.6	2.901241
	122 53 04.631	99.5	173 24 42	353 24 38	Cottonwood Island light, upper rear.	1139.9	3.056850
			232 40 59	52 41 12	Cotton	466.6	2.668895
Cottonwood Island light, upper rear,[1] 1913.	46 04 43.254	1335.5	359 12	179 12	Cottonwood Island	6.6	0.81964
	122 53 10.722	230.4					
Stack, Western Lumber Co., 1913	46 04 29.560	912.7	145 12 59	325 12 49	Old	517.4	2.713854
	122 54 02.018	43.4	249 18 38	69 19 15	Cottonwood Island light, upper rear.	1178.3	3.071260
			285 06 26	105 07 20	Cotton	1661.7	3.220566
Small house on shore, pipe,[1] 1913	46 06 01.29	39.8	340 18 14	160 18 58	Cut	3850.8	3.585548
	122 54 41.91	900.2	346 51 34	166 51 53	Old	2472.0	3.393041

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Chimney, near white house,[1] 1913	46 00 12.85	396.7	0 45 54	180 45 54	H 23_2 (U. S. E.)	632.8	2.801265
	122 50 31.33	674.2	144 36 26	324 36 21	Kalama	295.3	2.470240
Red barn, cupola, 1913	46 01 24.163	746.0	294 40 55	114 43 18	Kalama	4692.8	3.671432
	122 53 57.461	1236.1	302 36 53	122 39 22	H 23_2 (U. S. E.)	5256.1	3.720662
			320 34 26	140 36 15	Slue	5121.9	3.709434
Church, Goble, 1913	46 00 58.538	1807.4	295 55 17	115 56 37	Kalama	2675.2	3.427359
	122 52 31.108	669.2	308 29 28	128 30 54	H 23_2 (U. S. E.)	3282.2	3.516168
			336 13 54	156 14 40	Slue	3459.3	3.538993
Stack, Mountain Lumber Co., 1913	46 01 23.696	731.7	67 19 47	247 19 11	Knight	1162.6	3.065412
	122 51 41.004	882.1	145 14 23	325 13 24	Carr	3049.5	3.484229
			355 25 12	175 25 22	Slue	3955.5	3.597201
Coffin Rock light, 1913	46 02 09.121	281.6	194 58 39	14 59 12	Rail	3845.0	3.584901
	122 52 50.452	1085.0	309 46 08	129 46 41	Bank	1287.0	3.109594
			344 55 26	164 55 27	Coffin Rock (U. S. E.)	167.8	2.224839
Cable landing, north side sign post, 1913.	46 02 21.251	656.1	44 18 30	224 18 13	Coffin Rock (U. S. E.)	749.8	2.874930
	122 52 24.068	517.6	131 51 10	311 50 43	Carr	1091.2	3.037902
			148 34 37	328 34 06	Dock	1848.3	3.266782
Tank, Beaver Lumber Co., 1913	46 03 12.639	390.2	181 28 43	1 28 45	Cottonwood Island light	2792.1	3.445934
	122 53 14.070	302.5	196 27 57	16 28 16	Cotton	2024.7	3.306371
			220 34 18	40 35 08	Rail	2308.3	3.363290
			274 50 13	94 50 16	Dock	111.7	2.048061
West stack, Beaver Lumber Co.,[1] 1913.	46 03 11.35	350.3	181 52 52	1 52 55	Cottonwood Island light	2832.6	3.452183
	122 53 15.04	323.4	196 42 32	16 42 52	Cotton	2068.9	3.315748
New Enterprise Landing front light,[1] 1913.	46 00 06.91	213.3	259 12 43	79 13 58	Kalama	2268.1	3.355671
	122 52 22.83	491.3	280 37 56	100 39 16	H 23_2 (U. S. E.)	2432.7	3.386096
Sandy Island Channel, front light, 1913.	45 59 55.232	1705.3	248 23 57	68 25 03	Kalama	2132.3	3.328856
	122 52 11.426	245.9	272 21 34	92 22 46	H 23_2 (U. S. E.)	2147.3	3.331890
			321 17 50	141 18 22	Slue	1552.3	3.190978
Ahle Point light, 1913	45 59 53.939	1665.4	41 46 42	221 46 07	Slue	1571.0	3.196165
	122 50 37.699	811.2	152 27 47	332 27 00	Mill	3100.3	3.491398
			177 38 10	357 38 09	Kalama	825.3	2.916603
Shingle mill stack, Ahle Point, 1913	45 59 55.581	1716.1	41 19 28	221 18 52	Slue	1627.5	3.211511
	122 50 36.398	783.2	151 33 45	331 32 56	Mill	3068.6	3.486945
			175 25 03	355 25 01	Kalama	776.4	2.890069
Sandy Island house, pipe,[1] 1913	46 00 29.04	896.7	280 03 11	100 04 00	Kalama	1484.0	3.171438
	122 51 47.19	1015.2	348 44 18	168 44 33	Slue	2299.7	3.361664
School, Kalama, 1913	46 00 31.591	975.4	32 02 20	212 01 31	Slue	2753.3	3.439854
	122 50 18.465	397.2	112 10 52	292 09 17	Knight	3075.8	3.487962
			112 59 20	292 57 47	H 30_2 (U. S. E.)	3031.6	3.481679
Catholic Church, cross, Kalama, 1913.	46 00 33.743	1041.8	30 35 21	210 34 33	Slue	2788.4	3.445359
	122 50 20.400	438.8	111 18 35	291 17 01	Knight	3042.5	3.478933
			112 07 18	292 05 47	H 30_2 (U. S. E.)	2967.8	3.472433
Church, Kalama, star,[1] 1913	46 00 38.98	1203.6	23 29 13	203 28 36	Slue	2793.7	3.446184
	122 50 34.60	744.3	110 27 11	290 25 48	Knight	2669.5	3.426428
New Range, rear light, 1913	45 59 04.435	136.9	144 38 54	324 38 46	Slue	437.5	2.641023
	122 51 14.566	313.5	197 52 54	17 53 20	Kalama	2472.5	3.393141
			211 55 30	31 56 01	H 23_2 (U. S. E.)	1743.4	3.241385
New Range, front light, 1913	45 59 17.519	540.9	49 18 02	229 17 59	Slue	72.2	1.858622
	122 51 23.785	512.0	206 09 48	26 10 20	Kalama	2171.7	3.336792
			226 09 45	46 10 22	H 23_2 (U. S. E.)	1553.1	3.191208
Barn, gable, 1913	45 59 05.236	161.7	203 09 34	23 10 08	Kalama	2194.6	3.341350
	122 51 25.574	550.5	218 32 03	38 32 42	H 23_2 (U. S. E.)	1860.0	3.269511
			255 34 24	75 35 22	H 21 (U. S. E.)	1776.9	3.249658
White house, terra cotta pipe, 1913	45 59 25.636	791.5	221 24 21	41 25 11	Kalama	2264.7	3.355006
	122 51 48.895	1052.5	253 41 47	73 42 49	Rock	1942.6	3.288377
			301 30 28	121 30 44	Slue	569.7	2.755644
Tank, large black, oil, 1913	45 59 44.417	1371.4	238 09 17	58 10 17	Kalama	2120.5	3.326436
	122 52 03.000	64.5	270 54 35	90 55 48	Rock	2168.3	3.336112
			318 01 54	138 02 20	Slue	1180.3	3.071989
Light on dolphin, 1913	45 59 49.280	1521.5	235 17 24	55 18 10	Kalama	1701.0	3.230704
	122 51 44.269	952.5	266 30 41	86 31 33	H 23_2 (U. S. E.)	1564.0	3.194234
			339 24 28	159 24 41	Slue	1097.9	3.040555
Enterprise landing, front light, 1913	46 00 05.854	180.7	258 14 37	78 15 51	Kalama	2243.5	3.350921
	122 52 21.364	459.7	296 03 18	116 04 56	H 21 (U. S. E.)	3252.1	3.512168
			316 03 50	136 05 10	Flat	3450.5	3.537884
Large tree, top out, 1913	45 57 57.001	1759.8	343 21 04	163 21 26	Martin 3 (U. S. E.)	2223.3	3.346989
	122 48 40.564	873.4	109 04 42	289 03 50	H 22 (U. S. E.)	1661.9	3.220597
			133 40 01	313 39 50	Hill	490.2	2.690367

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Bluff (U. S. E.), 1913	45 57 38.021	1173.9	42 59 14.3	222 58 36.9	Connel 2 (U. S. E.)	1641.8	3.215319
	122 48 25.367	546.3	94 12 41.6	274 11 42.3	H 20 (U. S. E.)	1780.2	3,250471
			348 38 34.7	168 38 45.0	Martin 3 (U. S. E.)	1579.9	3.198634
Bend (U. S. E.), 1913	45 57 43.218	1334.4	174 59 48.5	354 59 44.6	H 19 (U. S. E.)	1344.2	3.128473
	122 49 21.169	455.8	214 13 23.0	34 13 40.4	Hill (U. S. E.)	924.0	2.965666
			277 36 04.4	97 36 44.6	Bluff (U. S. E.)	1212.3	3.083596
			318 29 06.5	138 29 57.1	Martin 3 (U. S. E.)	2282.7	3.358456
Day mark on tree, Bybee Landing, 1913.	45 58 13.561	418.7	91 40 58	271 40 22	H 22 (U. S. E.)	1082.7	3.034519
	122 49 03.246	69.9	117 42 02	297 41 00	Flat (U. S. E.)	2112.7	3.324844
			322 15 51	142 15 57	Hill (U. S. E.)	218.6	2.339558
Hoffman Landing light, June, 1913	45 58 38.514	1189.1	19 22 25	199 22 16	H 22 (U. S. E.)	783.0	2.893789
	122 49 41.450	892.4	101 24 27	281 23 52	Flat (U .S. E.)	1069.3	3.029114
			117 08 59	297 07 43	Slue (U. S. E.)	2536.8	3.404293
H 24 (U. S. E.), 1913	45 58 38.511	1189.0	131 21 47.9	311 21 03.9	Slue (U. S. E.)	1751.4	3.243393
	122 50 25.253	543.6	198 26 22.2	18 26 36.3	H 21 (U. S. E.)	1336.2	3.125870
			286 14 56.8	106 15 38.9	H 19 (U. S. E.)	1314.9	3.118898
			317 13 31.4	137 13 54.2	H 22 (U. S. E.)	1006.2	3.002894
Chimney, white house,[1] 1913	45 58 58.341	1801.3	63 42 26	243 41 59	Flat (U. S. E.)	904.6	2.956469
	122 49 52.466	1129.3	105 06 24	285 05 16	Slue (U. S. E.)	2092.5	3.320664
Front chimney, white house, H. and R. Duck Club, 1913.	45 49 28.632	884.0	219 58 19	39 58 55	Ten (U. S. E.)	1701.7	3.230881
	122 47 52.185	1126.5	320 51 12	140 52 45	Six (U. S. E.)	1683.7	3.226277
			338 48 32	158 48 33	Nine (U. S. E.)	47.2	1.674070
Peninsula Lumber Co., black tank, 1913.	45 54 05.636	174.0	207 25 59	27 26 27	H 11 (U. S. E.)	1812.5	3.258289
	122 48 43.946	947.3	227 24 51	47 25 16	H 9_2 (U. S. E.)	1021.6	3.009266
			260 33 59	80 34 28	H 7_2 (U. S. E.)	892.9	2.950824
Day mark on dolphin, 1913	45 55 58.974	1820.8	9 31 22	189 31 11	H 11 (U. S. E.)	1916.9	3.282609
	122 47 50.479	1087.5	75 59 13	255 58 19	H 16_2 (U. S. E.)	1673.4	3.223607
			134 47 23	314 46 20	Connel 2 (U. S. E.)	2636.1	3.420968
White house, near wharf, north chimney, 1913.	45 53 32.655	1008.2	187 45 46	7 45 58	H 11 (U. S. E.)	2651.2	3.423449
	122 48 21.814	470.4	199 07 24	19 07 38	H 7_2 (U. S. E.)	1232.6	3.090819
			295 19 49	115 20 46	H 5_2 (U. S. E.)	1904.0	3.279664
Dark Pile, day mark, 1913	45 57 20.523	633.6	64 28 35	244 27 49	Connel 2 (U. S. E.)	1533.3	3.185632
	122 48 13.098	282.1	127 40 44	307 39 32	H 22 (U. S. E.)	2731.3	3.436376
			146 34 25	326 34 08	Martins Bluff	921.9	2.964671
Deer Island Jetty light, July, 1913	45 55 51.209	1581.1	67 50 37	247 56 23	H 16_2 (U. S. E.)	441.0	2.644484
	122 48 46.864	1009.6	203 52 37	23 53 03	Martin 3 (U. S. E.)	1912.5	3.281602
			289 00 32	109 01 14	H 13_2 (U. S. E.)	1353.6	3.131476
Old Barn, gable, 1913	45 56 55.223	1705.0	179 13 01	359 13 01	Connel 2 (U. S. E.)	120.3	2.080289
	122 49 17.266	371.9	209 24 19	29 24 48	Martins Bluff	1779.9	3.250387
			279 02 37	99 03 24	Martin 3 (U. S. E.)	1447.0	3.160457
Bybee Landing light, July, 1913	45 58 06.098	188.3	102 27 16	282 26 36	H 22 (U. S. E.)	1216.0	3.084927
	122 48 58.364	1256.6	121 32 22	301 31 16	Flat (U. S. E.)	2318.1	3.365134
			206 27 05	26 27 06	Hill (U. S. E.)	643.1	2.808250
Old Orchard, 1878	45 55 45.618	1408.4	193 47 16.4	13 47 46.7	Martins Bluff	3809.4	3.580855
	122 49 18.846	406.0	266 33 24.9	86 36 15.3	Burnt Hill	5117.9	3.709089
			344 23 08.4	164 23 39.6	Adams	3483.0	3.541950
Maxwell, 1878	45 54 07.545	232.9	64 45 53.4	244 45 30.3	Adams	765.8	2.884132
	122 48 03.223	69.5	151 43 01.7	331 42 07.3	Old Orchard	3438.7	3.536394
Old house, yellow terra-cotta chimney, 1913.	45 52 21.149	653.0	18 44 16	198 43 47	Warrior (U. S. E.)	2751.2	3.439519
	122 46 37.231	802.9	32 24 07	212 23 30	H 4 (U. S. E.)	2107.0	3.323665
			3 33 01	183 33 01	H 3 (U. S. E.)	501.2	2.699998
St. Helens Bar front range light, July, 1913.	45 53 17.104	528.1	191 50 10	11 50 21	H 7_2 (U. S. E.)	1680.4	3.225415
	122 48 19.072	411.2	281 22 52	101 23 47	H 5_2 (U. S. E.)	1696.1	3.229198
			315 48 19	135 49 30	H 3 (U. S. E.)	3106.7	3.492300
St. Helens Bar rear range light, July, 1913.	45 53 21.756	671.7	197 45 44	17 46 00	H 7_2 (U. S. E.)	1576.2	3.197618
	122 48 25.388	547.4	284 53 13	104 54 22	H 5_2 (U. S. E.)	1860.5	3.269622
			315 50 37	135 52 03	H 3 (U. S. E.)	3304.6	3.519121
Columbia City front range light, July, 1913.	45 53 46.743	1443.2	216 56 44	36 57 02	H 7_2 (U. S. E.)	912.9	2.960440
	122 48 28.537	615.2	303 48 31	123 49 33	H 5_2 (U. S. E.)	2245.6	3.351338
			337 18 09	157 18 15	H 8_2 (U. S. E.)	458.3	2.661123
Columbia City rear range light, July, 1913.	45 53 39.159	1209.0	196 02 45	16 02 59	H 9_2 (U. S. E.)	1569.9	3.195867
	122 48 29.182	629.2	210 16 29	30 16 48	H 7_2 (U. S. E.)	1116.0	3.047658
			296 22 31	118 23 33	H 5_2 (U. S. E.)	2136.5	3.329899
Unpainted house, stovepipe, 1913	45 54 29.175	900.8	7 34 40	187 34 32	H 8_2 (U. S. E.)	1748.1	3.242567
	122 48 09.644	207.9	38 12 36	218 12 16	Dock (U. S. E.)	960.5	2.982513
			340 11 25	160 11 27	H 9_2 (U. S. E.)	37.7	1.576802
White house, chimney, back, 1913	45 54 21.474	663.0	9 19 21	189 19 13	H 8_2 (U. S. E.)	1515.1	3.180439
	122 48 08.952	193.0	49 40 27	229 40 07	Dock (U. S. E.)	798.9	2.902480
			179 23 57	359 23 57	H 9_2 (U. S. E.)	202.3	2.305913

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Adams, 1878	45 53 56.969	1758.9	228 43 45.1	48 46 04.2	Burnt Hill	5550.4	3.744326
	122 48 35.358	762.2	282 23 29.4	102 27 24.1	Lewis River Hill	7217.1	3.858360
Carruthers, 1878	45 53 07.316	225.9	127 57 51.4	307 56 45.9	Adams	2492.5	3.396636
	122 47 04.202	90.6	145 37 21.6	325 36 39.2	Maxwell	2253.2	3.352806
			203 01 55.2	23 03 08.8	Burnt Hill	5643.0	3.751508
Rock crusher, southeast stack, 1913	45 52 19.013	587.0	217 55 59	37 56 37	H 5_2 (U. S. E.)	1849.7	3.267105
	122 47 54.742	1180.7	284 49 01	104 49 55	H 3 (U. S. E.)	1697.3	3.229754
			323 47 58	143 48 46	H 1_2 (U. S. E.)	2442.5	3.387829
St. Helens jetty light, July, 1913	45 52 24.726	763.4	101 47 30	281 46 52	H 6_2 (U. S. E.)	1146.4	3.059333
	122 47 04.138	89.2	182 03 10	2 03 11	H 5_2 (U. S. E.)	1283.3	3.108320
			318 01 17	138 01 35	H 3 (U. S. E.)	821.4	2.914544
Lemont, 1878	45 52 26.352	813.6	177 04 38.4	357 04 33.1	Maxwell	3128.4	3.495318
	122 47 55.823	1203.9	207 12 19.6	27 14 10.2	Burnt Hill	7261.8	3.861042
			221 20 53.6	41 21 30.7	Carruthers	1684.9	3.226570
			258 36 41.2	78 40 07.5	Lewis River Hills	6320.9	3.800778
Balsam, 1878	45 52 16.844	520.1	100 02 03.9	280 01 08.6	Lemont	1686.0	3.226854
	122 46 38.845	837.8	160 39 56.7	340 39 38.5	Carruthers	1651.5	3.217869
St. Helens Congregational Church, 1913.	45 51 59.154	1826.3	209 00 01	29 00 39	H 5_2 (U. S. E.)	2369.1	3.374585
	122 47 55.272	1192.2	263 48 50	83 49 45	H 3 (U. S. E.)	1662.0	3.220633
			313 02 24	133 03 13	H 1_2 (U. S. E.)	1989.4	3.298733
St. Helens new courthouse, dome, 1913.	45 51 49.608	1531.6	251 52 34	71 53 23	H 3 (U. S. E.)	1523.1	3.182737
	122 47 45.781	987.6	310 23 54	130 24 35	H 1_2 (U. S. E.)	1640.4	3.214938
			336 30 55	156 31 07	H 4 (U. S. E.)	877.9	2.943448
St. Helens School, small cupola, 1913.	45 51 49.749	1536.0	206 24 30	26 25 10	H 5_2 (U. S. E.)	2637.7	3.421225
	122 47 56.413	1217.0	254 21 35	74 22 31	H 3 (U. S. E.)	1741.4	3.240899
			324 24 54	144 25 14	H 4 (U. S. E.)	995.5	2.998020
United Wireless Co., pole, 1913	45 51 46.867	1447.0	256 09 45	76 11 01	H 3 (U. S. E.)	2335.7	3.368422
	122 48 23.817	513.8	295 17 53	115 19 02	H 1_2 (U. S. E.)	2289.4	3.359716
			319 11 43	139 12 46	Lake (U. S. E.)	2891.5	3.461126
St. Helen's Church, 1878	45 51 44.766	1382.1	202 52 08.4	22 53 57.0	Burnt Hill	8402.8	3.924423
	122 47 53.298	1149.7	238 19 49.4	58 20 42.8	Balsam	1886.8	3.275717
			247 35 47.0	67 39 11.2	Lewis River Hills	6643.4	3.822392
			299 22 59.6	119 23 46.1	Russell	1604.1	3.205238
			307 06 47.1	127 09 20.9	Reed	5812.1	3.764331
St. Helens Lumber Co., pole near gable of mill, 1913.	45 51 39.292	1213.1	239 54 04	59 54 50	H 3 (U. S. E.)	1579.8	3.198599
	122 47 42.036	906.9	302 30 36	122 31 15	H 1_2 (U. S. E.)	1385.5	3.141618
			331 04 03	151 04 12	H 4 (U. S. E.)	556.1	2.745177
Russell, 1878	45 51 19.269	594.9	40 35 54.0	220 35 34.3	Warriors Point	908.7	2.958424
	122 46 48.509	1046.4	144 58 25.4	324 57 36.9	Lemont	2529.4	3.403020
			186 41 16.5	6 41 23.4	Balsam	1789.8	3.252800
Warriors Point, 1878	45 50 56.920	1757.4	162 41 14.7	342 40 46.0	Lemont	2892.2	3.461233
	122 47 15.916	343.4	183 35 24.0	3 35 32.4	Carruthers	4033.8	3.605716
			197 57 10.6	17 57 37.2	Balsam	2594.0	3.413962
Lake River, 1878	45 50 43.802	1352.4	126 45 23.4	306 45 05.4	Warriors Point	676.8	2.830492
	122 46 50.783	1095.8	156 06 21.5	336 05 34.6	Lemont	3463.1	3.539468
			176 15 49.6	356 15 39.8	Carruthers	4440.4	3.647418
			182 33 54.3	2 33 55.9	Russell	1096.1	3.039855
Warrior Rock Lighthouse, ventilator, August, 1913.	45 50 56.806	1753.8	226 09 15	46 09 35	H 1_2 (U. S. E.)	818.5	2.913003
	122 47 15.240	328.8	327 30 33	147 30 47	Lake (U. S. E.)	762.8	2.882400
			348 12 53	168 13 04	Ten (U. S. E.)	1448.8	3.161000
St. Helens Lumber Co., north stack, 1913.	45 51 37.956	1171.9	238 40 26	58 41 12	H 3 (U. S. E.)	1603.1	3.204973
	122 47 42.159	909.5	300 59 29	121 00 08	H 1_2 (U. S. E.)	1366.1	3.135484
			328 37 13	148 37 22	H 4 (U. S. E.)	521.8	2.717513
Henrici Landing rear range light, August, 1913.	45 48 53.726	1658.8	345 15 35	165 15 37	Seven 2 (U. S. E.)	220.7	2.343791
	122 47 55.234	1192.5	281 26 31	101 27 08	Six (U. S. E.)	1151.3	3.061186
			343 23 31	163 23 59	D (U. S. E.)	3004.9	3.477835
Henrici Landing front range light, August, 1913.	45 48 48.159	1486.9	48 47 24	228 47 22	Seven 2 (U. S. E.)	63.1	1.800033
	122 47 50.434	1088.9	273 09 30	93 10 04	Six (U. S. E.)	1026.3	3.011295
			344 24 56	164 25 21	D (U. S. E.)	2811.1	3.448873
Powder House, low stack, 1913	45 48 52.674	1626.3	346 50 02	166 50 03	Seven 2 (U. S. E.)	185.8	2.269077
	122 47 54.591	1178.5	279 58 04	99 58 41	Six (U. S. E.)	1131.7	3.053720
			324 40 56	144 41 59	A (U. S. E.)	3251.4	3.512064
Shobert, 1881	45 48 53.944	1665.5	358 05 30.4	178 05 35.7	Fales	4763.0	3.677880
	122 44 44.358	957.7	40 46 31.5	220 40 54.4	Bouser	15586.7	4.192753
			62 41 54.8	242 35 34.0	Scappoose	12920.7	4.111288
			141 30 24.5	321 27 27.9	Table Cliff	8525.6	3.930724
Ladd,[1] 1881	45 49 19.75	609.8	249 08 24	69 09 49	Reed	2721.2	3.434766
	122 46 16.37	353.4	338 52 38	158 53 50	Fales	5957.1	3.775036
Meadows, 1881	45 47 48.060	1483.8	30 45 01.2	210 41 48.6	Bouser	11374.0	4.055914
	122 48 06.110	132.0	61 18 02.9	241 14 06.7	Scappoose	8118.8	3.909492

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Four 2 (U. S. E.), 1913	45 48 16.712	516.0	355 16 36.2	175 16 38.2	Two (U. S. E.)	723.3	2.859295
	122 46 40.634	877.5	63 43 59.1	243 43 15.4	One 2 (U. S. E.)	1462.5	3.165082
			96 18 53.9	276 18 05.0	Five 2 (U. S. E.)	1483.5	3.171297
Abrams, 1881	45 47 48.779	1506.0	47 28 54.5	227 23 01.0	Bouser	14486.9	4.160977
	122 44 21.325	460.5	71 54 29.2	251 47 52.0	Scappoose	12602.2	4.100447
			146 14 59.7	326 11 46.7	Table Cliff	10445.6	4.018933
Batchelors Point Light, August, 1913	45 47 18.409	568.4	13 41 35	193 41 25	Dead Willow (U. S. E.)	1251.9	3.097562
	122 46 22.706	490.4	57 46 24	237 45 58	E (U. S. E.)	921.9	2.964696
			93 10 25	273 09 47	D (U. S. E.)	1141.5	3.057470
Fales's House, red chimney, 1881	45 46 10.564	326.2	56 39 30.9	236 33 50.8	Bouser	12297.5	4.089818
	122 44 40.015	864.6	85 38 33.8	265 32 10.0	Scappoose	11608.8	4.064786
			183 53 26.6	3 53 42.0	Reed	6825.3	3.834122
Nelson, 1881	45 45 52.247	1613.1	35 00 07.7	214 57 44.0	Bouser	7569.6	3.879073
	122 49 14.231	307.5	86 42 38.6	266 39 31.3	Scappoose	5658.6	3.752710
Cloniger,[1] 1881	45 44 53.58	1654.2	35 39 38	215 37 54	Bouser	5402.9	3.732625
	122 50 09.35	202.1	108 25 55	288 23 27	Scappoose	4699.3	3.672032
Knapp, 1881	45 44 20.027	618.3	308 01 13.8	128 02 16.0	Brookside	2384.3	3.377369
	122 45 16.734	361.8	11 44 57.8	191 43 16.0	Willamet	15151.5	4.180457
			70 32 57.8	250 27 44.0	Bouser	10053.0	4.002294
			103 12 08.9	283 06 11.5	Scappoose	11074.4	4.044321
Knapp's chimney, 1881	45 44 16.700	515.6	17 57 27.0	197 54 49.4	Willamet	15484.6	4.189901
	122 43 58.807	1271.4	73 48 27.9	253 42 18.3	Bouser	11626.1	4.065434
			101 56 10.3	281 49 17.0	Scappoose	12741.2	4.105212
Sheringhousen,[1] 1878	45 44 08.50	262.4	32 18 00	212 16 57	Bouser	3560.4	3.551494
	122 51 07.01	151.6	131 44 23	311 42 36	Scappoose	4304.7	3.633947
Brookside, 1881	45 43 32.449	1001.9	20 23 28.8	200 20 44.9	Willamet	14257.4	4.154041
	122 43 49.870	1078.5	80 37 24.8	260 31 08.9	Bouser	11512.0	4.061150
			107 32 34.6	287 25 35.0	Scappoose	13276.3	4.123078
Oak Ridge,[1] 1881	45 43 10.79	333.1	74 10 41	254 08 19	Bouser	4458.9	3.649225
	122 49 16.64	359.9	129 46 46	309 43 40	Scappoose	7283.3	3.862328
Harris, 1881	45 42 27.172	838.9	13 45 16.6	193 43 45.0	Willamet	11685.1	4.067632
	122 45 30.902	668.4	90 51 02.1	270 45 58.6	Bouser	9173.8	3.962549
			119 51 21.8	299 45 34.7	Scappoose	12078.6	4.082018
Morgan, 1881	45 40 47.068	1453.2	112 41 10.0	292 36 54.8	Bouser	8361.2	3.922271
	122 46 38.325	829.4	195 01 03.2	15 02 01.6	Knapp	6807.6	3.832991
			9 03 37.4	189 02 54.3	Willamet	8364.2	3.922427
Hendrickson,[1] 1881	45 39 32.79	1012.4	28 12 53	208 11 08	Willamet	6770.4	3.830616
	122 45 11.40	246.8	140 38 23	320 37 21	Morgan	2966.4	3.472226
Howell house, east chimney, 1881	45 38 29.738	918.1	13 34 30.0	193 33 58.0	Willamet	4135.7	3.616546
	122 46 54.314	1176.3	135 22 10.7	315 18 07.0	Bouser	10448.5	4.020714
			244 07 55.0	44 08 01.8	Howell	293.7	2.467898
Hillside,[1] 1883	45 37 54.92	1695.5	249 38 13	69 40 08	Howell	3698.1	3.567974
	122 49 24.96	540.5	316 41 33	136 42 35	Quigley	2748.2	3.439051
Quigley, 1883	45 36 50.132	1547.7	205 43 11.0	25 44 03.2	Howell	3647.5	3.561999
	122 47 57.965	1255.9	274 53 57.9	94 55 22.1	Gatton	2564.0	3.408910
House, west gable, 1883	45 36 07.175	221.5	2 20 36.5	182 20 33.9	Springville	1950.6	3.290161
	122 46 06.322	137.0	46 39 07.2	226 38 37.2	Watts	1252.3	3.097713
			99 26 11.3	279 25 17.1	Kaiser	1663.8	3.221104
Gatton's house, chimney, 1883	45 35 57.370	1771.2	8 00 00.0	187 59 52.4	Springville	1662.4	3.220732
	122 45 59.329	1285.7	62 20 04.9	242 19 29.9	Watts	1199.4	3.078954
			107 47 53.0	287 46 53.8	Kaiser	1883.0	3.274842
Thistle,[1] 1883	45 34 12.57	388.2	199 23 10	19 23 26	Caples	1445.2	3.159938
	122 45 13.13	284.7	263 15 45	83 16 45	Waud	1820.8	3.260251
Mann,[1] 1883	45 33 44.65	1378.6	171 05 23	351 05 11	Caples	2252.4	3.352643
	122 44 34.90	757.1	222 19 40	42 20 12	Waud	1454.5	3.162722
Portland Episcopal Church, spire, 1883	45 31 20.207	623.8	101 57 21.3	281 56 14.9	King	2064.5	3.314805
	122 40 33.616	729.5	187 56 15.0	7 52 22.4	Montgomery	1651.0	3.217746
			332 49 18.7	152 50 02.5	Tibbets	2916.9	3.464924
			24 01 09.5	204 00 41.0	Hoffmans Hill	1909.5	3.280921
Portland customhouse, dome, 1882–3	45 31 08.661	267.4	112 19 18.1	292 18 15.3	King	2064.5	3.314808
	122 40 38.680	839.5	189 34 25.5	9 34 36.5	Montgomery	2010.0	3.305366
			327 12 16.6	147 13 04.0	Tibbets	2662.8	3.425339
			25 40 54.4	205 40 32.5	Hoffmans Hill	1539.8	3.187469
Portland Methodist Church, spire, 1883	45 31 02.066	63.8	115 26 10.0	295 25 01.7	King	2299.7	3.361673
	122 40 30.984	672.5	184 24 04.4	4 24 09.9	Montgomery	2202.0	3.342813
			327 55 32.0	147 56 13.9	Tibbets	2401.4	3.380467
			35 10 15.0	215 09 47.6	Hoffmans Hill	1448.6	3.160934

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Portland courthouse dome, 1883	45 31 00.464	14.3	118 32 29.6	298 31 26.9	King	2170.7	3.336603
	122 40 38.812	842.4	188 34 57.4	8 35 06.5	Montgomery	2270.4	3.356102
			323 56 54.9	143 57 42.4	Tibbets	2455.6	3.390155
			30 21 12.7	210 20 50.9	Hoffmans Hill	1314.9	3.118888
Portland Congregational Church spire, 1883.	45 30 52.994	1636.1	122 03 32.8	302 02 26.2	King	2388.5	3.378124
	122 40 33.405	725.0	185 06 47.1	5 06 54.3	Montgomery	2485.5	3.395406
			322 53 11.9	142 53 55.5	Tibbets	2200.5	3.342513
			40 51 15.3	220 50 49.6	Hoffmans Hill	1195.2	3.077447
Portland Waterworks, pumping tower, 1883.	45 30 24.228	748.0	314 54 10.9	134 54 39.4	Tibbets	1227.9	3.089150
	122 40 12.308	267.2	11 15 56.3	191 15 46.5	Homestead	1523.0	3.182705
			89 15 54.6	269 15 13.8	Hoffmans Hill	1239.9	3.093392
Homestead, 1883	45 29 35.846	1106.7	147 28 27.3	327 27 56.3	Hoffmans Hill	1752.6	3.243690
	122 40 26.010	564.8	241 45 26.6	61 46 04.9	Tibbets	1374.9	3.122195
Large white house, chimney,[1] August, 1913.	45 45 46.17	1425.5	106 12 50	286 12 14	Fales	1113.5	3.046802
	122 44 41.00	886.2	117 25 03	297 23 51	Grassy	2440.0	3.387387
Fales Landing light, 1913	45 45 49.079	1515.3	171 26 32	351 26 31	Fales	223.5	2.349277
	122 45 28.955	625.9					
Windmill, on unpainted tower, 1913	45 44 56.226	1735.9	294 00 31	114 01 09	W 9 (U. S. E.)	1250.2	3.096990
	122 46 18.526	400.4	3 55 58	183 55 58	W 14 (U. S. E.)	125.9	2.099925
Red mill, spindle, 1913	45 44 24.239	748.4	248 53 51	68 54 32	W 9 (U. S. E.)	1330.1	3.123878
	122 46 23.097	499.4	285 12 17	105 13 07	W 7_3 (U. S. E.)	1563.4	3.194074
			314 52 21	134 53 08	Range 2 (U. S. E.)	2093.2	3.320815
Red house, chimney, 1913	45 44 18.835	581.5	242 31 55	62 32 36	W 9 (U. S. E.)	1399.9	3.146086
	122 46 23.151	500.5	279 09 03	99 09 53	W 7_3 (U. S. E.)	1529.3	3.184501
			332 46 01	152 46 41	W 5_3 (U. S. E.)	2665.8	3.425826
Yellow house, south chimney, 1913	45 44 16.215	500.6	239 51 47	59 52 28	W 9 (U. S. E.)	1447.2	3.160533
	122 46 23.592	510.1	276 05 51	96 06 41	W 7_3 (U. S. E.)	1528.0	3.184136
			309 26 29	129 27 16	Range 2 (U. S. E.)	1984.7	3.286621
Old windmill, high tank, 1913	45 43 50.781	1567.8	246 47 01	66 47 49	W 7_3 (U. S. E.)	1580.1	3.198678
	122 46 20.494	443.1	287 16 55	107 17 41	Range 2 (U. S. E.)	1494.3	3.174447
			322 18 38	142 19 16	W 5_3 (U. S. E.)	1900.8	3.278946
East silo, 1913	45 43 34.329	1059.9	231 59 20	52 00 08	W 7_3 (U. S. E.)	1836.3	3.263940
	122 46 20.234	437.5	267 25 19	87 26 05	Range 2 (U. S. E.)	1423.0	3.153196
			310 44 09	130 44 47	W 5_3 (U. S. E.)	1526.7	3.183748
White house, middle chimney, 1913	45 43 33.274	1027.3	265 57 14	85 57 59	Range 2 (U. S. E.)	1368.5	3.136251
	122 46 17.625	381.1	311 12 45	131 13 21	W 5_3 (U. S. E.)	1462.7	3.165159
			18 47 16	198 47 14	W 10_3 (U. S. E.)	180.7	2.257017
Upper Willow Bar range, front light, August, 1913.	45 43 36.259	1119.5	162 05	342 05	Range 2 (U. S. E.)	4.51	0.65417
	122 45 14.431	312.0					
Upper Willow Bar range, rear light, August, 1913.	45 43 38.813	1198.3	31 17	211 17	Range 2 (U. S. E.)	87.25	1.94077
	122 45 12.400	268.1					
Lower Willow Bar range, front light, August, 1913.	45 43 08.614	265.9	4 48 54	184 48 53	W 5_3 (U. S. E.)	208.2	2.307966
	122 45 25.968	561.4	45 15 06	225 14 30	W 6 (U. S. E.)	1512.3	3.179626
Lower Willow Bar range, rear light, August, 1913.	45 43 03.248	100.3	24 30 12	204 30 11	W 5_3 (U. S. E.)	40.5	1.607455
	122 45 25.970	561.7	50 03 48	230 03 12	W 6 (U. S. E.)	1400.4	3.146249
Reeder's house, north chimney,[1] 1913	45 43 00.35	10.8	211 57 34	31 58 19	W 7_3 (U. S. E.)	2569.3	3.409818
	122 46 16.22	350.8	230 10 27	50 11 11	Range 2 (U. S. E.)	1737.9	3.240031
Old church belfry, front spindle, 1913	45 43 05.985	184.8	170 49 58	350 49 54	W 10_3 (U. S. E.)	680.1	2.832580
	122 46 15.305	331.0	213 44 57	33 45 40	W 7_3 (U. S. E.)	2412.4	3.382451
			276 35 00	96 35 34	W 5_3 (U. S. E.)	1057.2	3.024146
New house, chimney, 1913	45 42 41.213	1272.4	206 04 57	26 05 42	W 7_3 (U. S. E.)	3064.8	3.486226
	122 46 16.047	347.1	217 59 46	38 00 29	Range 2 (U. S. E.)	2162.1	3.334873
			238 53 09	58 53 44	W 5_3 (U. S. E.)	1245.4	3.095316
Reeder Point light, August, 1913	45 42 03.213	99.2	180 13 32	0 13 32	W 4_3 (U. S. E.)	89.0	1.949390
	122 46 25.046	541.8	288 32 07	108 32 42	W 3 (U. S. E.)	1120.9	3.049550
Morgan Wharf light, September, 1913.	45 40 39.929	1232.8	292 49 07	112 49 42	One 3 (U. S. E.)	1156.3	3.063067
	122 46 34.567	748.1	308 33 23	128 34 09	Middle	1790.3	3.252932
			345 21 38	165 21 45	Two 2 (U. S. E.)	831.2	2.919706
High tank, remains of windmill, 1913.	45 40 40.119	1238.6	292 19 02	112 19 39	One 3 (U. S. E.)	1196.3	3.077840
	122 46 36.456	788.9	307 54 00	127 54 48	Middle	1826.1	3.261518
			342 47 11	162 47 19	Two 2 (U. S. E.)	848.1	2.928426
Mountain View Dairy Farm, windmill on barn, 1913.	45 40 13.721	423.6	340 48 49	160 48 53	Middle	325.0	2.511829
	122 45 34.824	753.8	90 15 53	270 15 17	Two 2 (U. S. E.)	1083.1	3.034668
			147 46 37	327 46 29	One 3 (U. S. E.)	426.3	2.629684
Schoolhouse, belfry, 1913	45 40 02.165	66.8	342 09 48	162 09 52	Three 3 (U. S. E.)	420.9	2.624166
	122 45 25.453	551.0	105 42 54	285 42 11	Two 2 (U. S. E.)	1335.9	3.125770
			117 37 06	297 38 03	Middle	108.3	2.034754

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Windmill, white tank, 1913	45 39 53.685	1657.5	45 56 36	225 56 10	Four 2 (U. S. E.)	1102.7	3.042473
	122 45 22.710	491.6	114 52 12	294 51 28	Two 2 (U. S. E.)	1482.8	3.171096
			153 29 21	333 29 16	Middle	348.3	2.541932
Coon Island Light, October, 1913	45 39 19.179	592.1	205 30 20	25 30 41	Middle	1525.7	3.183465
	122 46 00.241	5.2	356 03 28	176 03 30	Mud	891.9	2.950316
			16 27 57	196 27 39	Pen	1904.9	3.279883
Willamette River range front light, October, 1913.	45 39 08.224	253.9	72 41 25	252 41 02	School	723.4	2.859385
	122 45 46.754	1012.4	155 53 37	335 53 26	End	828.9	2.918509
			205 00 43	25 01 03	Three 3 (U. S. E.)	1395.5	3.144733
Day mark, October, 1913	45 38 45.897	1417.0	140 46 13	320 46 00	School	612.0	2.786739
	122 46 00.776	16.8	178 36 49	358 36 48	End	1446.4	3.160276
			207 53 24	27 53 26	Mud	155.8	2.192623
Gillihan tank, white, 1913	45 38 47.527	1467.3	46 18 58	226 18 46	Howell	489.9	2.690095
	122 46 28.511	617.3	206 44 31	26 44 38	School	474.5	2.676217
			262 36 07	82 36 27	Mud	679.1	2.831943
Three Tree Island Shoal Light, October, 1913.	45 38 34.379	1061.4	351 55 27	171 55 29	Pen	448.2	2.651471
	122 46 28.081	608.0	100 31 26	280 31 14	Howell	369.8	2.567982
			233 23 39	53 24 00	Mud	527.3	2.917674
Post Office Bar lower light, October, 1913.	45 38 11.574	357.3	326 34 22	146 35 22	Gatton	3275.4	3.515263
	122 47 23.340	505.5	351 29 25	171 29 32	Sand	1349.3	3.130099
			358 54 04	178 54 06	Linton	3991.8	3.601172
Post Office Bar range front light, October, 1913.	45 37 50.147	1548.2	217 19 13	37 19 49	Howell	1802.2	3.255797
	122 47 35.324	765.1	315 06 41	135 07 49	Gatton	2924.6	3.466070
			325 41 09	145 41 24	Sand	814.7	2.910995
Post Office Bar range rear light, October, 1913.	45 37 53.329	1646.5	316 07 16	136 08 25	Gatton	3010.8	3.478687
	122 47 36.381	788.0	327 58 58	147 59 15	Sand	909.5	2.958793
			354 01 04	174 01 16	Linton	3446.6	3.537390
Linton Landing Light, October, 1913.	45 36 17.022	525.5	175 37 30	355 37 24	Sand	2208.6	3.344115
	122 47 06.346	137.5	240 47 31	60 48 18	Gatton	1645.3	3.216245
			32 41 46	212 41 35	Linton	540.1	2.732475
Vancouver Bridge, center of draw,[1] 1913.	45 37 37.53	1158.6	69 29 32	249 25 14	Linton	8377.7	3.923128
	122 41 17.75	384.5	119 26 04	299 22 43	Four 2 (U. S. E.)	6999.6	3.845071
Swan Island Bar upper light,[1] 1913	45 32 58.77	1814.4	101 02 43	281 02 00	Forty-four (U. S. E.)	1335.6	3.125692
	122 41 37.20	807.0	169 40 00	349 39 52	P (U. S. E.)	1451.1	3.161708
Incinerator, stack, 1913	45 32 33.052	1020.4	122 05 44	302 04 22	Scott	2953.2	3.470300
	122 42 11.836	256.8	142 07 37	322 05 43	Caples	5620.6	3.749784
			192 27 26	12 27 42	P (U. S. E.)	2275.1	3.357010
Swan Island Bar lower light, 1913	45 33 33.822	1044.2	37 52 54	217 52 32	Forty-four (U. S. E.)	1047.0	3.019953
	122 42 06.001	173.5	171 26 18	351 26 09	T (U. S. E.)	1751.0	3.243284
			229 43 08	49 43 21	P (U. S. E.)	534.3	2.727768
Swan Island Channel front light, 1913.	45 33 40.394	1247.0	32 31 58	212 31 36	Forty-four (U. S. E.)	1220.8	3.086658
	122 42 07.372	159.9	169 49 33	349 49 24	T (U. S. E.)	1553.0	3.191176
			250 06 26	70 06 39	P (U. S. E.)	418.9	2.622154
Swan Island Channel rear light,[1] 1913.	45 33 47.91	1479.1	280 00 25	100 00 42	P (U. S. E.)	514.6	2.711452
	122 42 12.57	272.6	334 03 59	154 04 03	Swan Island Channel, front light.	258.0	2.411535
Mocks Bottom Light, 1913	45 34 09.827	303.4	234 57 44	54 58 13	T (U. S. E.)	1079.9	3.033374
	122 43 00.802	17.4	296 15 26	116 16 17	P (U. S. E.)	1731.3	3.238383
			342 00 14	162 00 18	F (U. S. E.)	479.4	2.680723
Sawmill, west stack, 1913	45 34 16.756	517.3	252 46 59	72 47 42	T (U. S. E.)	1372.0	3.137358
	122 43 20.466	443.8	31 49 21	211 48 48	Scott	1921.8	3.283706
			43 52 14	223 52 04	R (U. S. E.)	470.8	2.672796
Swan Island Range front light, 1913	45 34 06.710	206.9	138 45 35	318 44 50	Caples	2053.9	3.312582
	122 43 48.544	1052.7	275 54 18	95 54 27	R (U. S. E.)	284.2	2.453552
			21 39 07	201 38 58	Forty (U. S. E.)	671.4	2.826996
Swan Island Range rear light, 1913	45 34 04.628	142.9	20 58 48	200 58 32	Scott	1347.9	3.129662
	122 43 44.935	974.4	30 13 02	210 12 51	Forty (U. S. E.)	647.8	2.811425
			138 19 19	318 18 32	Caples	2153.9	3.333229
Union Oil Co., white tank, knob, 1913.	45 33 46.334	1430.4	166 20 49	346 20 32	Caples	2236.6	3.349590
	122 44 26.645	577.8	243 53 13	63 54 43	T (U. S. E.)	3057.6	3.485384
			328 40 55	148 41 09	Scott	812.1	2.909603
Cement stack, 1913	45 34 30.612	945.1	3 35 29	183 35 26	Forty (U. S. E.)	1364.6	3.135018
	122 43 56.026	1214.8	6 41 57	186 41 49	Scott	2074.9	3.317003
			124 05 12	304 04 32	Caples	1439.0	3.158069
Peninsula Lumber Co., stack, 1913	45 34 34.178	1055.2	350 45 41	170 45 50	Forty (U. S. E.)	1491.3	3.173576
	122 44 11.008	238.8	357 48 47	177 48 50	Scott	2172.4	3.336938
			128 46 20	308 45 51	Caples	1112.0	3.046123
Fairmont Gas Co., stack, 1913	45 34 45.826	1414.8	252 26 30	72 27 05	Caples	1116.3	3.047796
	122 45 40.093	869.3	290 32 04	110 34 48	P (U. S. E.)	5347.1	3.728116
			294 35 22	114 36 51	R (U. S. E.)	2971.0	3.472901

[1] No check on this position.

Mouth of the Columbia River to Portland—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
N. P. R. R. bridge light, center of draw,[1] 1913.	45 34 38.30	1182.4	172 11 11	352 11 08	Caples	574.4	2.759236
	122 44 47.40	1027.7	302 47 26	122 48 17	R (U. S. E.)	1854.3	3.268186
Portland woolen mills, red tank, 1913.	45 35 20.589	635.6	316 26 32	136 28 42	Forty-four (U. S. E.)	5687.2	3.754900
	122 45 38.309	830.4	323 42 39	143 43 49	Forty (U. S. E.)	3602.5	3.556720
			331 15 21	151 16 26	Scott	4109.8	3.613823
Red tank on bluff, spindle,[1] 1913	45 34 31.08	959.5	24 41 28	204 40 57	Scott	2283.9	3.358674
	122 43 23.20	503.0	30 05 13	210 04 47	Forty (U. S. E.)	1590.6	3.201561
University flagstaff,[1] 1913	45 34 20.11	620.8	257 53 15	77 54 01	T (U. S. E.)	1441.5	3.158900
	122 43 25.02	542.5	318 57 34	138 57 56	F (U. S. E.)	1025.6	3.010975
Windmill on bluff,[1] 1913	45 34 32.09	990.7	22 21 33	202 21 18	F (U. S. E.)	1236.4	3.092143
	122 42 32.28	699.9	59 20 31	239 19 46	R (U. S. E.)	1593.9	3.202448
Round barn,[1] 1913	45 33 21.20	654.5	127 00 58	307 00 54	Scott	136.2	2.134324
	122 44 02.17	47.1	183 30 03	3 30 04	Forty (U. S. E.)	782.3	2.893366
Large red tank with pole,[1] 1913	45 32 44.81	1383.4	113 38 35	293 37 04	Scott	3007.6	3.478221
	122 42 00.16	3.5	137 43 27	317 41 25	Caples	5505.8	3.740818
Portland tall building weather vane,[1] 1913.	45 32 00.31	9.6	131 33 57	311 32 21	Scott	3888.8	3.589818
	122 41 53.04	1150.9	144 41 39	324 39 32	Caples	6675.6	3.824493
White tank, inshore one of two, 1913.	45 35 12.629	389.9	321 05 44	141 07 28	Forty-four (U. S. E.)	4980.9	3.697308
	122 45 01.850	40.1	333 13 09	153 13 53	Forty (U. S. E.)	2978.5	3.473997
			340 33 08	160 33 47	Scott	3561.0	3.551575
St. Johns Lumber Co., inshore stack, 1913.	45 35 06.209	191.7	290 09 54	110 10 21	Caples	857.7	2.933314
	122 45 28.135	609.9	322 11 08	142 12 11	Forty (U. S. E.)	3118.7	3.493972
			330 57 47	150 58 45	Scott	3617.3	3.558383
St. Johns Lumber Co., tank, 1913	45 35 07.460	230.3	315 25 45	135 27 47	Forty-four (U. S. E.)	5216.6	3.717388
	122 45 26.414	572.6	323 07 32	143 08 34	Forty (U. S. E.)	3124.3	3.494752
			331 45 00	151 45 57	Scott	3630.6	3.559976
Standard Oil Co., white tank,[1] 1913	45 33 52.20	1611.6	248 27 14	68 28 50	T (U. S. E.)	3171.5	3.501271
	122 44 36.08	782.5	324 23 23	144 23 44	Scott	1076.1	3.031858
St. Johns High School,[1] 1913	45 35 23.15	714.7	329 08 45	149 09 44	Forty (U. S. E.)	3475.7	3.541037
	122 45 22.16	480.4	336 10 30	156 11 24	Scott	4025.7	3.604838
St. Johns Fire Hall, flagstaff,[1] 1913	45 35 22.34	689.7	330 17 08	150 18 04	Forty (U. S. E.)	3406.5	3.532312
	122 45 17.83	386.5	336 16 13	157 17 04	Scott	3965.4	3.598288
Crest, 1913	45 29 57.927	1788.3	181 51 02.5	1 51 11.3	River	8369.9	3.922718
	122 42 26.377	572.6	225 04 51.6	45 06 08.2	Oregonian	3292.1	3.517473
Mills, 1913	45 32 16.488	509.0	332 21 08.5	152 21 42.1	Oregonian	2205.3	3.343471
	122 41 26.118	566.7	17 00 22.4	196 59 39.4	Crest	4473.2	3.650618
			165 46 31.4	345 45 57.2	River	4217.1	3.625018
Federal east wireless, 1913	45 28 15.279	471.7	105 55 48.7	285 49 42.9	Crest	11582.0	4.063784
	122 33 53.411	1160.2	121 59 47.1	301 54 57.8	Oregonian	10378.7	4.016141
			127 11 45.8	307 06 22.9	Mills	12330.6	4.090985
Federal west wireless, 1913	45 28 15.237	470.4	106 08 31.9	286 02 31.0	Crest	11437.5	4.058331
	122 34 00.350	7.6	122 26 50.8	302 22 06.4	Oregonian	10251.8	4.010801
			127 37 37.2	307 32 19.2	Mills	12211.7	4.086775
Y. M. C. A. east wireless, Portland,[1] 1913.	45 31 06.346	195.9	156 31 44.5	336 31 13.6	Mills	2360.9	3.373075
	122 40 42.779	928.5	201 19 47.8	21 19 50.5	Oregonian	227.5	2.356931
Y. M. C. A. west wireless, Portland,[1] 1913.	45 31 07.046	217.5	157 28 17.2	337 27 48.0	Mills	2321.0	3.365682
	122 40 45.131	979.6	215 06 37.1	35 06 41.5	Oregonian	232.6	2.366578
Journal spire, 1913	45 31 08.123	250.8	45 39 44.0	225 38 31.1	Crest	3100.3	3.491402
	122 40 44.245	960.3	156 42 40.1	336 42 10.2	Mills	2297.9	3.361328
			162 35 10.7	342 34 06.6	River	6496.4	3.812673
			216 06 57.3	36 07 01.0	Oregonian	194.3	2.288575
Old Garbage Plant, chimney, 1913	45 32 32.126	991.8	327 14 01.5	147 14 11.7	Mills	574.1	2.759021
	122 41 40.440	877.3	331 17 36.4	151 18 20.2	Oregonian	2777.7	3.443677
			11 49 58.1	191 49 25.3	Crest	4863.8	3.686977
Columbia Flour Mills, water tank, 1913.	45 33 17.272	533.2	8 11 19.2	188 10 50.1	Crest	6217.6	3.793624
	122 41 45.588	988.9	164 28 43.7	344 28 23.4	River	2294.9	3.360768
			339 19 03.1	159 19 50.6	Oregonian	4093.8	3.612128

[1] No check on this position.

Columbia River from the mouth of the Willamette River to the Cascade Locks.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Shaw, 1889	45 36 36.677	1132.3	245 05 05.8	65 06 44.6	Harney	3303.7	3.519004
	122 40 11.844	256.7	310 30 31.8	130 35 01.4	Rocky Butte	10772.0	4.032296
Stansbury, 1889	45 34 31.018	957.6	193 53 20.4	13 54 03.4	Harney	5429.4	3.734753
	122 38 53.697	1164.3	295 39 21.9	115 42 55.7	Rocky Butte	7205.1	3.857642
Wintler, 1889	45 36 55.201	1704.2	337 48 52.6	157 50 34.3	Rocky Butte	8179.1	3.912705
	122 36 16.673	361.3	37 24 58.6	217 23 06.4	Stansbury	5603.4	3.748450
			83 37 12.0	263 34 23.9	Shaw	5127.6	3.709914
Lower Point, 1889	45 35 41.492	1281.0	354 08 53.4	174 09 11.3	Rocky Butte	5326.5	3.726439
	122 34 19.337	419.1	131 50 16.0	311 48 52.2	Wintler	3412.3	3.533052
Hexter, 1889	45 36 19.075	588.9	3 48 51.0	183 48 36.8	Rocky Butte	6473.3	3.811128
	122 33 34.453	746.6	39 58 48.5	219 58 16.4	Lower Point	1514.1	3.180159
			64 17 37.8	244 13 49.6	Stansbury	7682.2	3.885487
Jungle, 1889	45 36 24.261	749.0	103 30 22.3	283 29 29.7	Shaw	1642.2	3.215418
	122 38 58.155	1260.4	218 16 06.3	38 16 52.5	Harney	2260.2	3.354150
Quartermasters Wharf, 1889	45 37 15.229	470.2	266 07 11.5	86 08 49.5	Harney	2978.5	3.474000
	122 40 10.710	232.1	315 01 09.3	135 02 01.1	Jungle	2224.3	3.347190
			1 10 58.0	181 10 57.2	Shaw	1190.5	3.075715
Rauer, 1889	45 37 35.003	1080.6	285 08 49.0	105 10 03.3	Quartermasters Wharf	2334.9	3.368263
	122 41 54.739	1185.8	308 55 09.2	128 56 22.7	Shaw	2865.7	3.457232
Sisters farm, 1889	45 37 58.564	1808.0	322 05 51.7	142 06 56.6	Shaw	3203.5	3.505631
	122 41 42.665	923.9	19 46 37.4	199 46 28.8	Rauer	773.0	2.888169
Allman, 1889	45 38 37.375	1153.9	302 33 43.0	122 34 44.9	Sisters farm	2225.9	3.347513
	122 43 09.278	200.9	320 01 00.7	140 01 54.0	Rauer	2512.9	3.400181
Hayden, 1889	45 38 10.567	326.2	218 41 19.6	38 41 41.5	Allman	1060.5	3.025502
	122 43 39.888	863.9	278 17 32.7	98 18 56.5	Sisters farm	2565.9	3.409238
Hood, 1891	45 35 02.674	82.6	29 23 30.6	209 22 14.6	Rocky Butte	4705.6	3.672611
	122 32 07.846	170.1	141 29 37.8	321 28 35.9	Hexter	3014.5	3.479219
Prune Hill, 1891	45 34 59.249	1829.2	64 59 29.3	244 54 47.9	Rocky Butte	9435.1	3.974748
	122 27 20.144	436.7	90 59 58.9	270 56 33.4	Hood	6238.0	3.795047
Mays, 1891	45 34 19.266	594.8	34 32 37.9	214 31 35.4	Rocky Butte	3350.6	3.525125
	122 32 26.721	579.4	134 01 41.3	313 58 57.0	Wintler	6929.6	3.840707
Taggarts Bluff, 1891	45 33 30.929	954.9	81 08 46.4	261 04 19.6	Rocky Butte	8203.5	3.913998
	122 27 40.649	881.8	103 33 13.1	283 29 48.7	Mays	6380.8	3.801873
			189 15 33.4	9 15 48.0	Prune Hill	2762.7	3.441335
Fisher, 1891	45 35 22.597	607.6	279 29 59.1	99 32 20.6	Prune Hill	4358.5	3.639337
	122 30 38.431	833.1	42 01 51.6	221 59 31.7	Rocky Butte	6346.3	3.802522
			72 24 11.1	252 23 07.2	Hood	2033.6	3.308259
Harlow, 1891	45 32 27.941	862.6	92 41 37.6	272 33 32.2	Rocky Butte	14768.6	4.169340
	122 22 34.257	743.2	127 01 24.4	306 58 00.3	Prune Hill	7762.9	3.890024
Daniels, 1891	45 34 58.377	1802.2	312 20 39.4	132 23 27.1	Harlow	6891.9	3.838341
	122 26 29.048	629.8	67 42 23.0	247 37 05.1	Rocky Butte	10439.3	4.018671
Washougal, 1891	45 34 41.118	1269.4	26 55 09.0	206 54 00.3	Harlow	4610.8	3.663774
	122 20 58.040	1258.3	94 16 45.2	274 12 48.8	Daniels	7196.1	3.857097
Eagles Bluff, 1891	45 32 32.576	1005.7	124 15 16.3	304 11 38.4	Daniels	8003.2	3.903265
	122 21 23.918	518.9	188 02 49.8	8 03 08.3	Washougal	4007.9	3.602922
Mount Pleasant, 1891	45 33 46.256	1428.0	72 47 53.3	252 43 52.0	Eagles Bluff	7677.1	3.885195
	122 15 45.882	995.0	99 08 06.2	279 00 26.8	Daniels	14122.5	4.149912
			104 04 46.2	284 01 03.3	Washougal	6977.6	3.843704
			85 53 24.6	265 40 27.5	Rocky Butte	23672.0	4.374235
Remington, 1891	45 35 05.605	173.0	274 59 18.3	95 00 32.2	Prune Hill	2252.2	3.352604
	122 29 03.637	78.8	56 24 38.6	236 21 11.1	Rocky Butte	7569.3	3.879058
Government Island, 1891	45 34 31.743	980.0	125 11 01.0	305 10 12.1	Remington	1814.6	3.258788
	122 27 55.223	1197.4	221 50 42.5	41 51 07.5	Prune Hill	1140.0	3.056892
Quarry, 1891	45 35 03.054	94.3	275 08 36.5	95 09 19.4	Prune Hill	1309.1	3.116959
	122 28 20.283	439.7	330 39 32.0	150 39 49.9	Government Island	1108.9	3.044889
			94 47 37.6	274 47 06.6	Remington	943.1	2.974576
Ladys Island, 1891	45 34 22.952	708.6	109 10 04.6	289 08 20.8	Daniels	3333.3	3.522880
	122 24 03.816	82.7	262 03 18.0	82 05 30.7	Washougal	4066.9	3.609260
			331 18 34.0	151 19 37.9	Harlow	4047.3	3.607165
Brush, 1901	45 32 07.830	241.7	162 03 02.9	342 02 12.4	Washougal	4974.7	3.696770
	122 19 47.330	1026.9	239 51 18.5	59 54 10.8	Mount Pleasant	6055.2	3.782129
Cliff, 1901	45 32 24.726	763.4	85 36 00.0	265 32 18.6	Brush	6751.9	3.829425
	122 14 37.065	804.1	117 02 30.5	296 57 58.6	Washougal	9273.8	3.967260
			149 20 13.3	329 19 24.2	Mount Pleasant	2926.4	3.466334
Grout, 1901	45 33 45.749	1412.4	335 49 22.8	155 49 59.7	Cliff	2741.8	3.438039
	122 15 28.823	625.1	61 41 48.3	241 38 43.8	Brush	6370.6	3.804177
			103 29 55.4	283 26 00.4	Washougal	7340.6	3.865730

Columbia River from the mouth of the Willamette River to the Cascade Locks—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Shepard, 1901	45 32 51.460	1588.7	77 34 15.9	257 32 12.8	Cliff	3829.6	3.583157
	122 11 44.687	969.4	109 02 39.8	288 59 59.8	Grout	5142.3	3.711160
Mount Zion, 1901	45 34 52.151	1610.0	347 14 11.7	167 14 39.5	Shepard	3820.4	3.582110
	122 12 23.595	511.5	32 28 10.1	212 26 34.8	Cliff	5394.0	3.731907
			62 58 42.0	242 56 29.7	Grout	4509.3	3.654113
Angel, 1901	45 34 14.020	432.8	51 10 54.4	231 09 10.2	Shepard	4064.8	3.609043
	122 09 18.692	405.4	106 22 57.4	286 20 45.4	Mount Zion	4178.4	3.621005
Twin Mountain, 1901	45 35 47.928	1479.6	6 31 19.5	186 31 08.6	Angel	2918.1	3.465098
	122 09 03.406	73.8	32 42 45.4	212 40 50.3	Shepard	6473.9	3.811165
			68 22 33.2	248 20 10.2	Mount Zion	4668.7	3.669194
Railroad, 1901	45 34 32.100	991.0	56 42 10.5	236 41 42.5	Angel	1016.7	3.007176
	122 08 39.504	856.6	97 16 59.8	277 14 19.8	Mount Zion	4897.8	3.690004
			167 31 18.2	347 31 01.1	Twin Mountain	2397.7	3.379792
Oneonta, 1901	45 35 20.430	630.7	74 15 18.0	254 12 23.9	Railroad	5490.4	3.739602
	122 04 35.784	775.7	98 21 09.4	278 17 58.2	Twin Mountain	5862.6	3.768094
			148 31 25.1	328 30 32.0	Bluff	3085.6	3.489342
Bluff, 1901	45 36 45.662	1409.7	41 41 39.5	221 39 38.5	Railroad	5520.8	3.741999
	122 05 50.140	1086.5	66 57 56.7	246 55 38.6	Twin Mountain	4551.8	3.658180
Lookout, 1901	45 37 35.640	1100.3	28 08 01.1	208 06 47.5	Oneonta	4733.2	3.675151
	122 02 52.826	1144.4	68 08 05.4	248 05 58.7	Bluff	4139.8	3.616983
Dodson, 1901	45 36 38.813	1198.3	58 28 41.4	238 26 31.4	Oneonta	4626.2	3.665221
	122 01 33.862	733.8	92 12 22.6	272 09 19.5	Bluff	5557.1	3.744851
			135 43 44.4	315 42 48.0	Lookout	2450.5	3.389252
Warren, 1901	45 36 51.863	1601.3	73 57 22.9	253 56 36.7	Dodson	1457.2	3.163518
	122 00 29.232	633.3	113 29 48.0	293 28 05.4	Lookout	3391.9	3.530437
Climb, 1901	45 38 42.631	1316.1	0 22 40.3	180 22 39.5	Warren	3419.8	3.534007
	122 00 28.191	610.5	20 25 07.5	200 24 20.5	Dodson	4078.8	3.610529
			56 34 50.9	236 33 07.5	Lookout	3753.8	3.574472
Bonneville, 1901	45 37 39.542	1218.0	68 06 22.8	248 04 22.3	Warren	3937.3	3.595202
	121 57 40.619	879.9	118 16 17.3	298 14 17.5	Climb	4120.3	3.614931
Aldrich, 1901	45 39 14.398	444.6	334 53 31.3	154 54 16.6	Bonneville	3237.0	3.510144
	121 58 44.027	953.2	27 23 11.5	207 21 56.2	Warren	4955.5	3.695089
			66 30 35.1	246 29 20.6	Climb	2459.5	3.390852
Moffat, 1901	45 40 24.607	759.7	16 01 38.5	196 00 50.1	Bonneville	5304.9	3.724678
	121 56 33.005	714.3	52 37 32.4	232 35 58.7	Aldrich	3569.8	3.552645
Cascade, 1901	45 39 34.610	1068.5	59 36 14.0	239 32 54.1	Bonneville	7020.8	3.846388
	121 53 01.062	23.0	85 13 49.6	265 09 44.3	Aldrich	7451.7	3.872253
			108 36 58.7	288 34 27.1	Moffat	4840.6	3.684903
End, 1901	45 41 25.779	795.9	40 10 06.3	220 08 30.6	Cascade	4490.6	3.652302
	121 50 47.270	1022.8	75 52 05.4	255 47 58.1	Moffat	7716.8	3.887436
Stackhouse, 1901	45 42 31.794	981.6	336 47 19.6	156 47 48.5	End	2217.6	3.345875
	121 51 27.662	598.4	20 17 17.4	200 16 10.6	Cascade	5831.8	3.765799
			59 18 21.5	239 14 43.0	Moffat	7685.7	3.885684
Bradford, 1901	45 38 09.396	290.1	99 34 46.4	279 31 25.0	Climb	6183.4	3.791230
	121 55 46.634	1010.1	117 36 00.6	297 33 53.7	Aldrich	4334.1	3.636901
			66 28 50.9	346 28 17.7	Moffat	4293.4	3.632806
Locks, 1901	45 40 18.024	556.4	36 15 53.2	216 14 17.0	Bradford	4924.4	3.692352
	121 53 32.146	695.8	92 59 23.2	272 57 13.8	Moffat	3919.9	3.593278
			213 06 02.0	33 07 30.9	Stackhouse	4930.7	3.692908
			333 20 24.1	153 20 46.2	Cascade	1499.8	3.176026
Supplementary points.							
Vancouver Episcopal Church,[1] 1889	45 37 35.59	1098.8	312 44 47	132 45 52	Shaw	2679.2	3.428006
	122 41 42.64	923.7	86 02 35	266 02 27	Rauer	262.6	2.419323
Lucca Mill, pipe,[1] 1889	45 37 38.35	1184.0	327 05 02	147 05 43	Shaw	2268.1	3.355654
	122 41 08.72	188.9	84 05 01	264 04 28	Rauer	1002.2	3.000947
Sawmill, pipe, 1889	45 37 28.016	864.9	337 34 54.4	157 35 15.9	Shaw	1714.5	3.234147
	122 40 42.019	910.2	97 48 15.5	277 47 23.5	Rauer	1590.0	3.201404
Vancouver St. James Church,[1] 1889	45 37 51.57	1592.1	355 36 20	175 36 26	Shaw	2319.0	3.365309
	122 40 20.04	434.1	76 00 25	255 59 18	Rauer	2114.1	3.325120
Vancouver Presbyterian Church,[1] 1889	45 37 46.02	1420.8	351 05 43	171 05 54	Shaw	2167.0	3.335852
	122 40 27.32	591.8	79 49 30	259 48 28	Rauer	1923.9	3.284182
Railroad depot, northwest gable, 1889	45 36 26.189	808.6	114 03 41.8	294 03 17.9	Shaw	794.3	2.899979
	122 39 38.373	831.6	155 10 10.5	335 09 47.4	Quartermasters Wharf	1668.3	3.222268
			232 56 17.7	52 57 32.6	Harney	2846.1	3.454250
Vancouver lower flagstaff, 1889	45 37 37.925	1170.8	282 40 44.4	102 41 57.6	Harney	2275.6	3.357091
	122 39 36.016	780.2	340 09 43.5	160 10 10.5	Jungle	2417.7	3.383395
			19 41 05.0	199 39 00.2	Balch	11256.9	4.051420
			22 19 18.7	202 18 53.1	Shaw	2044.0	3.310490

[1] No check on this position.

Columbia River from the mouth of the Willamette River to the Cascade Locks—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Vancouver upper flagstaff, 1889	45 37 34.619	1068.8	283 02 01.0	103 02 57.6	Harney	1762.8	3.246207
	122 39 12.813	277.6	35 34 09.1	215 33 26.9	Shaw	2199.0	3.342229
			64 29 29.3	244 28 47.9	Quartermasters Wharf	1389.8	3.142954
Deaf and Dumb School, 1889	45 37 30.095	929.1	295 26 09.0	115 26 26.9	Harney	600.9	2.778785
	122 38 18.586	402.7	27 51 04.6	207 48 04.5	Balch	11712.9	4.068663
			56 06 26.7	236 05 05.8	Shaw	2956.5	3.470783
			79 18 42.1	259 17 22.0	Quartermasters Wharf	2472.0	3.393053
Marked tree, No. 1, 1889	45 36 05.689	175.6	105 40 29.4	285 39 22.0	Jungle	2123.5	3.327049
	122 37 23.808	516.0	120 42 42.5	300 40 43.3	Quartermasters Wharf	4205.8	3.623844
			164 39 33.4	344 39 12.2	Harney	2434.5	3.386417
Stenger,[1] 1889	45 36 35.23	1087.6	352 03 09	172 03 41	Rocky Butte	7025.2	3.846656
	122 34 39.08	846.8	55 13 57	235 10 55	Stansbury	6720.5	3.827402
House, chimney,[1] 1889	45 35 16.79	518.4	152 23 54	332 23 02	Wintler	3428.6	3.535122
	122 35 03.36	72.8	231 31 40	51 22 12	Lower Point	1221.5	3.086890
Fishers's wharf, southeast pile,[1] 1891	45 35 14.50	447.6	277 06 07	97 08 11	Prune Hill	3799.1	3.579682
	122 30 14.04	304.4	46 56 59	226 54 22	Rocky Butte	6538.7	3.815491
Bartlett's barn, north gable, 1891	45 34 33.230	1025.9	130 39 42.6	310 39 04.3	Remington	1534.1	3.185859
	122 28 09.955	215.8	166 19 58.6	346 19 51.2	Quarry	947.6	2.976625
			223 21 11.6	53 21 47.1	Prune Hill	1345.9	3.129025
Lever's house, east gable,[1] 1891	45 34 36.64	1131.2	150 04 29	330 04 12	Remington	1031.7	3.013554
	122 28 39.89	864.9	207 32 18	27 32 32	Quarry	919.6	2.963592
Fairview, cupola,[1] 1891	45 32 24.55	757.9	161 55 57	341 55 05	Prune Hill	5023.9	3.701040
	122 26 08.27	179.4	268 41 14	88 43 47	Harlow	4644.4	3.666929
Washougal Hall, flagstaff, 1891	45 34 42.128	1300.6	275 16 52.7	95 17 04.0	Washougal	338.7	2.529868
	122 21 13.598	294.8	3 12 14.7	183 12 07.4	Eagles Bluff	4005.9	3.602700
			22 54 04.1	202 53 06.6	Harlow	4496.9	3.652916
			94 13 35.2	274 09 49.9	Daniels	6857.4	3.836160
Washougal Schoolhouse, 1901	45 34 45.388	1401.2	298 24 42.8	118 29 06.6	Cliff	9116.1	3.959807
	122 20 46.632	1011.0	345 10 58.1	165 11 40.5	Brush	5031.4	3.701689
			61 57 07.8	241 56 59.7	Washougal	280.3	2.447563
Gibbons Creek, 1891	45 34 17.306	534.3	44 32 31.3	224 30 46.6	Eagles Bluff	4535.3	3.656608
	122 18 57.284	1242.1	105 41 44.7	285 40 18.5	Washougal	2719.5	3.434496
			282 59 08.1	103 01 24.7	Mount Pleasant	4259.9	3.629397
Gibbons Creek Church,[1] 1901	45 34 31.96	986.8	305 05 51	125 08 55	Cliff	6827.6	3.834271
	122 18 54.54	1182.7	14 26 03	194 25 25	Brush	4594.7	3.662258
Williams, 1891	45 32 17.848	551.0	149 45 21.4	329 43 56.5	Washougal	5120.7	3.709328
	122 18 59.079	1281.8	236 56 23.3	56 56 37.1	Mount Pleasant	5001.2	3.699078
Chamberlain's barn, 1901	45 32 06.593	203.5	95 22 49.6	275 22 36.3	Brush	407.3	2.609892
	122 19 28.642	621.5	157 53 23.0	337 52 19.2	Washougal	5149.6	3.711774
			237 29 29.1	57 32 08.1	Mount Pleasant	5728.6	3.758050
Big barn, east gable, 1901	45 32 19.304	596.0	136 02 17.7	315 59 58.6	Washougal	6084.4	3.784219
	122 17 43.232	938.0	223 28 02.1	43 29 25.8	Mount Pleasant	3699.4	3.568133
			227 31 01.1	47 32 37.0	Grout	3952.6	3.596882
Corbett, 1901	45 32 32.474	1002.6	220 24 01.1	40 25 04.9	Mount Pleasant	2991.6	3.475897
	122 17 15.285	331.6	225 34 44.0	45 36 00.0	Grout	3232.7	3.509567
			273 58 13.0	94 00 05.9	Cliff	3441.0	3.536680
Tunnel Point, tree, 1901	45 32 35.528	1096.9	210 56 00.3	30 56 43.1	Grout	2527.6	3.402701
	122 16 28.733	623.4	265 24 29.3	85 27 52.1	Shepard	6181.6	3.791103
			277 49 37.5	97 50 57.2	Cliff	2445.5	3.388368
Rooster Rock, 1901	45 32 38.867	1199.9	81 16 51	261 13 26	Brush	6300.5	3.799375
	122 15 00.308	6.7	115 58 37	295 54 22	Washougal	8627.7	3.935897
			154 35 23	334 34 51	Mount Pleasant	2303.4	3.362368
			163 19 35	343 19 15	Grout	2155.5	3.333552
Middle fish wheel, 1901	45 33 29.133	899.4	285 27 25.0	105 29 43.3	Shepard	4358.7	3.639357
	122 14 58.347	1265.5	346 55 37.7	166 55 52.9	Cliff	2041.3	3.309909
			68 12 28.6	248 09 02.4	Brush	6752.8	3.829483
Lower fish wheel, 1901	45 33 25.536	788.4	281 18 34.3	101 21 27.1	Shepard	5353.3	3.728623
	122 15 46.672	1012.2	321 11 02.8	141 11 52.5	Cliff	2409.3	3.381884
			65 20 39.0	245 17 47.3	Brush	5745.5	3.759328
Small white barn, north gable, 1901	45 32 23.457	724.2	183 39 56.5	3 40 01.9	Grout	2545.8	3.405823
	122 15 36.328	788.1	222 18 02.2	42 20 19.8	Mount Zion	6208.5	3.792990
			260 12 57.0	80 15 42.4	Shepard	5099.2	3.707498
White house chimney, small,[1] 1901	45 33 50.79	1568.2	1 35 26	181 35 24	Cliff	2658.2	3.424584
	122 14 33.66	730.1	64 59 23	244 55 39	Brush	7510.0	3.875638
Big barn, south gable,[1] 1901	45 33 55.68	1718.9	303 46 23	123 48 01	Shepard	3565.1	3.552070
	122 14 01.30	28.1	15 26 58	195 26 33	Cliff	2913.1	3.464359
Mount Pleasant Church, 1901	45 33 50.419	1556.5	226 23 33.4	46 24 39.3	Mount Zion	2763.7	3.441493
	122 13 55.899	1212.3	302 35 20.9	122 36 54.6	Shepard	3378.3	3.528694
			18 39 17.4	198 38 48.0	Cliff	2792.2	3.445948

[1] No check on this position.

Columbia River from the mouth of the Willamette River to the Cascade Locks—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Upper fish wheel, 1901	45 33 32.652	1008.0	296 35 41.3	116 37 04.9	Shepard	2839.5	3.453247
	122 13 41.734	905.2	29 47 23.9	209 46 44.4	Cliff	2416.3	3.383144
			71 45 49.0	251 41 28.1	Brush	8352.0	3.921792
Red barn, cupola, 1901	45 32 23.395	722.3	135 37 02.7	315 35 40.8	Grout	3558.2	3.551228
	122 13 34.066	739.1	198 24 01.5	18 25 51.8	Mount Zion	4840.1	3.684858
			249 55 49.8	69 57 07.9	Shepard	2526.1	3.402459
Barn, west gable, 1901	45 33 55.072	1700.2	313 20 03.2	133 21 11.7	Shepard	2861.2	3.456552
	122 13 20.624	447.2	30 44 14.6	210 43 20.0	Cliff	3244.9	3.511195
			68 29 58.0	248 25 22.0	Brush	9018.1	3.955115
Sawmill, stack, 1901	45 32 32.016	988.4	122 52 23.1	302 50 27.0	Grout	4195.7	3.622806
	122 12 46.336	1005.3	186 30 05.1	6 30 21.3	Mount Zion	4354.4	3.638927
			245 49 16.1	65 50 00.1	Shepard	1466.0	3.166123
Cape Horn tree, 1901	45 34 03.818	117.6	229 10 22.5	49 12 25.1	Twin Mountain	4918.0	3.691789
	122 11 55.104	1194.9	264 40 44.0	84 42 35.7	Angel	3406.3	3.532288
			354 13 26.0	174 13 32.4	Shepard	2245.3	3.351269
Pyramid tree, 1901	45 35 17.351	535.8	254 03 31.5	74 05 20.5	Twin Mountain	3440.3	3.536593
	122 11 36.030	781.0	269 21 37.8	89 26 38.0	Oneonta	9110.2	3.959529
			303 16 36.5	123 18 14.6	Angel	3562.2	3.551712
House in trees, cupola, 1901	45 33 18.379	567.4	71 08 49.2	251 06 09.8	Cliff	5120.1	3.709281
	122 10 53.730	1165.4	146 03 47.7	326 02 43.5	Mount Zion	3489.8	3.542801
			207 22 38.9	27 23 57.6	Twin Mountain	5199.9	3.715993
Lone Rock, 1901	45 34 22.068	681.3	277 06 03.9	97 07 09.5	Angel	2007.3	3.302606
	122 10 50.550	1096.0	22 46 29.3	202 45 50.7	Shepard	3033.7	3.481976
			53 37 07.6	233 34 25.9	Cliff	6704.2	3.785628
Bridal Veil sawmill,[1] 1901	45 33 26.74	825.6	140 01 48	320 00 35	Mount Zion	3441.1	3.536695
	122 10 41.63	903.0	206 01 51	26 03 01	Twin Mountain	4851.3	3.685854
White house, north gable,[1] 1901	45 33 46.97	1450.2	123 46 34	303 44 55	Mount Zion	3620.7	3.558794
	122 10 04.78	103.6	199 36 20	19 37 04	Twin Mountain	3964.2	3.598151
Dead tree (near Cabin Falls), 1901	45 34 28.407	877.0	96 30 22.8	276 29 49.9	Railroad	1006.8	3.002956
	122 07 53.336	1157.1	148 16 18.7	328 15 28.7	Twin Mountain	2886.6	3.460389
			212 12 42.7	32 14 10.7	Bluff	5009.0	3.699751
Signboard, 1901	45 34 48.320	1491.8	201 38 14.2	21 39 01.6	Bluff	3897.5	3.590789
	122 06 56.465	1224.1	225 36 11.0	45 39 05.1	Lookout	7386.7	3.868449
			251 58 44.9	72 00 25.4	Oneonta	3206.9	3.506082
Tall post, 1901	45 34 47.570	1468.6	139 13 19.5	319 12 26.5	Twin Mountain	2461.1	3.391124
	122 07 49.244	1067.6	215 17 20.2	35 18 45.3	Bluff	4467.2	3.650040
			231 02 28.8	51 06 00.5	Lookout	8257.7	3.916857
Dead tree, back of bluff, 1901	45 36 49.487	1527.8	298 51 33.6	118 51 40.8	Bluff	244.6	2.388501
	122 06 00.028	0.6	326 24 20.7	146 25 20.9	Oneonta	3300.4	3.518570
			64 27 33.3	244 25 22.3	Twin Mountain	4405.0	3.643948
McGowan's cannery, 1901	45 36 31.891	984.6	95 07 30.8	275 04 53.8	Bluff	4779.6	3.679391
	122 02 10.438	226.2	154 59 21.5	334 58 51.2	Lookout	2171.8	3.336828
			208 44 43.2	28 45 56.3	Climb	4604.1	3.663148
			254 54 26.1	74 54 52.2	Dodson	820.9	2.914278
Barn near McGowan's, north gable, 1901.	45 36 14.461	446.4	101 59 15.1	281 56 45.2	Bluff	4645.9	3.667074
	122 02 20.400	442.1	164 20 36.8	344 20 13.6	Lookout	2602.9	3.415453
			207 58 27.9	27 59 48.1	Climb	5180.2	3.714349
Butlers Landing, ice house, 1901	45 36 53.336	1646.6	155 09 04.1	335 08 44.2	Lookout	1439.4	3.158167
	122 02 24.904	539.6	216 49 49.3	36 51 12.8	Climb	4216.3	3.624935
			292 03 44.1	112 04 20.6	Dodson	1193.4	3.076789
Warrendale Church, spire, 1901	45 36 43.698	1349.1	90 34 14.7	270 30 42.9	Bluff	6421.6	3.807640
	122 00 53.793	1165.6	121 53 10.2	301 51 45.1	Lookout	3036.8	3.482420
			188 35 10.3	8 35 28.6	Climb	3713.5	3.569783
Gorman's house, 1901	45 36 50.520	1559.7	116 40 26.0	296 38 54.5	Lookout	3104.4	3.491983
	122 00 44.769	970.0	185 55 17.1	5 55 29.0	Climb	3479.8	3.541556
			262 58 39.4	82 58 50.5	Warren	339.2	2.530431
Castle Rock, 1901	45 37 41.863	1292.4	328 43 43.0	148 44 13.9	Warren	1806.0	3.256711
	122 01 12.498	270.8	13 22 38.3	193 22 23.0	Dodson	2000.8	3.301208
			84 57 29.3	264 56 17.6	Lookout	2181.8	3.338814
Gorman's barn, 1901	45 36 52.228	1612.4	114 39 47.1	294 38 10.7	Lookout	3213.5	3.506983
	122 00 38.013	823.6	183 34 15.1	3 34 22.1	Climb	3415.1	3.533407
			273 23 30.0	93 23 36.2	Warren	190.6	2.280126
Warren's cannery, 1901	45 36 55.280	1706.6	70 33 19.1	250 33 09.2	Warren	316.9	2.500938
	122 00 15.440	334.6	110 05 23.2	290 03 30.7	Lookout	3630.3	3.559939
			175 14 14.5	355 14 05.4	Climb	3325.8	3.521891
Hamilton fish wheel, 1901	45 37 38.307	1182.6	57 35 17.8	237 34 03.3	Warren	2674.4	3.427228
	121 58 45.029	975.4	131 38 26.4	311 37 12.7	Climb	2989.3	3.475575
			180 25 07.8	0 25 08.6	Aldrich	2966.7	3.472277

[1] No check on this position.

Columbia River from the mouth of the Willamette River to the Cascade Locks—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Railway water tank, 1901	45 38 11.686	360.8	22 08 03.4	202 07 50.0	Bonneville	1074.3	3.031139
	121 57 21.933	475.0	137 26 58.7	317 26 00.0	Aldrich	2628.5	3.419709
			271 57 06.7	91 58 14.9	Bradford	2065.3	3.314976
Fish wheel on north shore opposite Bradford Island, 1901.	45 38 45.224	1396.2	40 23 57.4	220 23 00.4	Bonneville	2666.1	3.425874
	121 56 20.852	451.6	89 10 05.8	269 07 09.0	Climb	5356.8	3.728902
			106 12 51.6	286 11 09.2	Aldrich	3228.4	3.508990
Cascade Locks Church, 1901	45 40 11.476	354.3	39 18 05.1	219 16 23.3	Bradford	4869.7	3.687500
	121 53 24.224	524.3	95 41 03.1	275 38 48.0	Moffat	4106.3	3.613447
			139 41 30.9	319 41 25.3	Locks	265.1	2.423380
			210 11 49.7	30 13 13.1	Stackhouse	5012.8	3.700083
Cascade Locks flagstaff, 1901	45 40 13.323	411.3	208 58 14.0	28 58 16.7	Locks	165.9	2.219922
	121 53 35.858	776.1	212 57 55.7	32 59 27.3	Stackhouse	5096.2	3.707247
			327 46 33.4	147 46 58.3	Cascade	1412.8	3.150068

The secondary triangulation.

Principal points.							
Roman, 1903	43 54 45.041	1390.1					
	123 44 14.987	334.5					
Mary, 1903	44 30 17.369	536.1					
	123 33 05.732	126.6	12 47 13.03	192 39 26.37	Roman	67471.43	4.8291199
Table, 1903	44 28 10.361	319.8	260 19 19.07	80 31 36.02	Mary	23566.77	4.3723001
	123 50 37.387	826.4	352 09 00.72	172 13 27.28	Roman	62474.59	4.7957034
Cummins, 1903	44 14 10.036	309.8	204 25 54.36	24 32 07.18	Table	28500.31	4.4548496
	123 59 30.690	681.1	229 27 14.39	49 45 42.75	Mary	46075.76	4.6634725
			330 22 18.08	150 32 55.04	Roman	41329.31	4.6162582
Foulweather, 1903	44 45 23.059	711.8	305 06 11.81	125 27 11.24	Mary	48405.24	4.6848924
	124 02 58.427	1285.1	332 47 19.52	152 55 59.96	Table	35820.58	4.5541326
			355 26 26.89	175 28 52.48	Cummins	57996.36	4.7634007
Maple, 1903	43 54 20.294	626.3	181 06 56.67	1 07 19.08	Cummins	36727.91	4.5649962
	124 00 02.917	65.1	267 50 26.39	88 01 23.79	Roman	21166.02	4.3256392
Fairview, 1903	44 11 59.942	1850.1	219 24 01.15	39 25 44.82	Cummins	5197.46	3.7157909
	124 01 59.351	1317.9	323 19 55.58	143 32 15.70	Roman	39768.92	4.5995438
			355 27 27.50	175 28 48.46	Maple	32808.04	4.5159803
Cape, 1903	44 06 23.325	719.9	202 08 15.79	22 10 28.40	Fairview	11218.06	4.0499176
	124 05 09.727	216.3	307 30 46.81	127 45 18.57	Roman	35295.34	4.5477174
			342 56 28.17	163 00 01.32	Maple	23339.09	4.3680838
Dean, 1903	43 41 44.174	1363.3	162 11 13.72	342 07 21.11	Maple	24515.71	4.3894444
	123 54 26.846	601.2	209 31 00.25	29 38 03.78	Roman	27710.52	4.4426447
Trail, 1903	43 46 08.829	272.5	204 12 34.80	24 16 06.52	Maple	16634.75	4.2210162
	124 05 08.603	192.4	240 14 39.21	60 29 07.53	Roman	32219.95	4.5081248
			299 33 54.92	119 41 18.56	Dean	16522.67	4.2180801
Schooner, 1903	43 41 54.965	1696.4	176 16 44.92	356 16 29.17	Trail	7851.53	3.8949541
	124 04 45.822	1026.1	271 19 01.01	91 26 08.62	Dean	13864.82	4.1419144
Burn, 1903	43 43 18.358	566.6	215 50 21.06	35 52 18.56	Trail	6491.36	3.8123356
	124 07 58.535	1310.2	279 00 34.65	99 09 55.52	Dean	18403.79	4.2649073
			300 47 55.38	120 50 08.55	Schooner	5023.87	3.7010382
Bald, 1903	44 58 31.806	981.8	3 45 23.13	183 43 25.61	Table	56344.68	4.7508529
	123 47 50.385	1104.0	39 23 52.54	219 13 11.96	Foulweather	31467.57	4.4978632
Iron, 1903	44 41 35.609	1099.2	181 38 19.27	1 38 25.70	Foulweather	7023.85	3.8465752
	124 03 07.559	166.4	212 37 13.46	32 48 00.14	Bald	37280.92	4.5714867
			326 16 11.48	146 24 58.04	Table	29861.55	4.4751124
Cascade, 1903	45 03 42.382	1308.3	305 29 34.83	125 36 48.19	Bald	16488.56	4.2171826
	123 58 03.055	66.8	10 50 20.26	190 46 51.73	Foulweather	34548.29	4.5384265
Salmon, 1903	45 01 12.390	382.5	209 18 11.24	29 19 35.30	Cascade	5310.26	3.7251158
	124 00 01.845	40.4	287 07 14.41	107 15 51.61	Bald	16770.82	4.2245543
			7 33 00.18	187 30 55.57	Foulweather	29560.08	4.4707056
Saddle Mountain 2, 1909	45 58 10.281	317.4	158 16 24.1	338 06 27.2	Bear	47777.0	4.679219
	123 41 04.267	91.9	189 24 23.6	9 29 35.0	Ten	56288.5	4.750420
Tillamook Head, 1874	45 57 55.431	1711.4	185 02 04.5	5 04 17.8	Bear	44990.7	4.653123
	123 57 56.395	1214.3	208 46 48.1	29 04 10.2	Ten	63961.9	4.805921
			268 41 37.1	88 53 44.8	Saddle Mountain 2	21796.8	4.338392
Saddle Mountain, 1874	45 58 10.078	311.2	88 54 43.0	268 42 35.4	Tillamook Head	21792.2	4.338302
	123 41 04.471	96.3	140 44 47.6	320 29 05.1	Battery	44238.3	4.645798
			150 57 41.4	330 47 41.3	Scarboro Hill 2	36739.6	4.565135
Neahkahnie, 1875	45 44 39.064	1206.1	175 31 47.8	355 30 43.7	Tillamook Head	24662.6	4.392039
	123 56 27.126	586.5	218 23 26.7	38 34 28.8	Saddle Mountain	31987.3	4.504978

The secondary triangulation—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Foley, 1875	45 39 07.551	238.1	138 00 36.2	317 55 31.0	Neahkahnie	13779.5	4.139233
	123 49 20.683	447.9	196 50 44.7	16 56 40.5	Saddle Mountain	36865.7	4.566623
Crag, 1875	45 38 29.150	899.9	140 51 12.1	320 46 04.1	Neahkahnie	14735.0	4.168350
	123 49 16.805	383.9	175 56 56.9	355 56 54.1	Foley	1188.5	3.075011
Miami, 1875	45 34 59.868	1848.3	171 25 53.1	351 24 23.9	Neahkahnie	18084.1	4.257297
	123 54 22.484	487.4	220 30 15.1	40 33 50.8	Foley	10061.2	4.002650
			225 40 48.9	45 44 27.4	Crag	9252.9	3.966279
Boulder Point, 1866	45 29 33.102	1021.9	184 56 51.8	4 57 20.5	Miami	10125.9	4.005435
	123 55 02.769	60.1	204 21 07.6	24 25 14.6	Crag	18170.5	4.259366
Shell Point, 1866	45 20 33.768	1042.5	51 06 19.7	231 05 03.5	Boulder Point	2982.2	3.474531
	123 53 15.878	344.7	170 01 52.7	350 01 05.1	Miami	8341.3	3.921236
			299 28 07.03	119 34 47.79	Ginger	14030.07	4.147060
			342 23 49.07	162 29 27.59	Hebo	34326.78	4.535633
			358 13 05.08	178 13 31.15	Buzzard Butte	25668.29	4.409396
Hebo, 1908	45 12 53.639	1655.9	7 03 16.91	187 01 30.49	Bald	26807.07	4.428249
	123 45 20.130	439.2	44 29 00.95	224 20 00.18	Cascade	23821.76	4.376973
Buzzard Butte, 1908	45 16 42.722	1318.9	306 24 04.26	126 29 16.10	Hebo	11904.88	4.075725
	123 52 39.259	855.7	349 21 14.73	169 24 39.44	Bald	34263.61	4.534833
			16 23 24.96	196 19 35.32	Cascade	25105.88	4.399773
Ginger, 1908	45 26 49.816	1537.9	4 10 26.65	184 09 25.24	Hebo	25882.40	4.413004
	123 43 53.794	1169.1	31 26 34.79	211 20 20.88	Buzzard Butte	21955.59	4.341545
White, 1904	43 07 14.428	445.2					
	123 02 14.761	336.0					
Onion, 1904	42 41 31.762	980.1	198 11 21.87	18 19 13.10	White	50126.59	4.700068
	123 13 46.921	1068.1					
Camas, 1906	43 00 07.386	227.9	257 25 01.30	77 55 20.37	White	61709.33	4.790350
	123 46 38.943	882.1	307 21 59.59	127 44 20.66	Onion	56482.19	4.751911
Bolivar, 1907	42 47 31.996	987.3	191 27 11.94	11 29 33.88	Camas	23785.21	4.376307
	123 50 07.463	169.6	282 25 36.66	102 50 16.60	Onion	50827.47	4.706096
			240 27 50.25	61 00 27.85	White	74641.12	4.872978
Johnson, 1906	42 48 55.841	1723.1	231 06 18.98	51 19 12.89	Camas	33080.51	4.519572
	124 05 35.651	809.9	276 54 21.44	97 04 52.14	Bolivar	21249.13	4.327341
Bennett, 1906	42 57 32.991	1018.0	263 06 42.57	83 26 59.38	Camas	40720.28	4.609810
	124 16 23.770	538.8	317 16 29.17	137 23 50.25	Johnson	21701.83	4.336496
			297 15 06.24	117 32 58.78	Bolivar	40297.64	4.605279
Sugar, 1906	43 03 50.680	1563.9	2 39 45.27	182 39 06.76	Johnson	27643.01	4.441585
	124 04 39.128	885.4	53 55 25.08	233 47 24.41	Bennett	19760.81	4.295804
			285 38 03.17	105 50 20.31	Camas	25406.29	4.404941
Westport, 1906	43 18 43.406	1339.5	334 08 05.88	154 14 49.67	Sugar	30601.77	4.485746
	124 14 29.125	656.4	3 47 31.87	183 46 13.48	Bennett	39289.85	4.594280
Cathcart, 1906	43 21 06.027	186.0	13 42 57.70	193 39 01.78	Sugar	32883.95	4.516984
	123 58 54.541	1228.4	78 16 54.65	258 06 13.32	Westport	21510.00	4.332640
			28 37 48.86	208 25 51.20	Bennett	49632.87	4.695769
Noah, 1906	43 23 27.048	834.7	289 48 42.57	109 54 50.01	Cathcart	12808.62	4.107502
	124 07 49.612	1116.6	45 49 34.79	225 45 00.54	Westport	12552.99	4.098747
Marshfield Hill, 1889	43 22 25.591	789.8	254 23 10.74	74 26 38.22	Noah	7059.32	3.848762
	124 12 51.690	1163.7	17 45 27.90	197 44 21.02	Westport	7199.43	3.857298
			277 20 29.71	97 30 04.49	Cathcart	19009.50	4.278970
Cape, 1907	42 50 13.493	416.4	240 12 18.42	60 24 11.90	Bennett	27376.30	4.437374
	124 33 51.928	1179.3	317 43 05.75	137 51 24.83	Bald	24883.58	4.395912
Butler, 1907	42 46 03.896	120.2	37 35 53.08	217 31 47.07	Bald	13534.31	4.131436
	124 15 34.116	775.7	176 58 13.25	356 57 39.47	Bennett	21293.94	4.328255
			236 22 14.95	56 41 55.79	Camas	47201.51	4.673953
Madden, 1907	42 50 27.775	857.1	334 55 12.22	154 59 35.44	Bald	20829.17	4.318673
	124 28 04.474	101.6	86 50 09.62	266 46 13.37	Cape	7902.94	3.897788
Sixes, 1869	42 50 39.870	1230.8	273 22 29.99	93 25 38.04	Madden	6291.19	3.798733
	124 32 41.026	931.6	289 57 12.16	110 08 50.03	Butler	24838.89	4.395132
			321 48 27.16	141 55 58.14	Bald	24464.60	4.388538
Heads, 1869	42 44 28.619	883.1	155 40 50.75	335 38 26.87	Cape	11680.08	4.067445
	124 30 20.129	457.8	195 31 59.53	15 33 31.68	Madden	11503.53	4.060831
			303 07 45.66	123 13 40.63	Bald	14231.66	4.153255
Port Orford astronomical 2, 1907	42 44 28.918	892.3	88 25 56.21	268 25 46.16	Heads	337.14	2.527818
	124 30 05.312	120.8	193 55 03.04	13 56 25.13	Madden	11408.93	4.057345
			303 55 12.49	124 00 57.42	Bald	13955.78	4.144754
Bald, 1907	42 40 16.220	500.5	192 30 03.35	12 33 36.06	Bennett	32773.00	4.515516
	124 21 36.745	836.7	232 09 06.12	52 32 52.45	Camas	60173.67	4.779406
Squirrel, 1907	42 35 52.651	1624.6	101 49 06.96	281 29 35.00	Bald	40255.03	4.604820
	123 52 46.417	1068.2	141 22 12.41	321 06 09.81	Bennett	51459.80	4.711468
			190 30 11.72	10 34 21.43	Camas	45659.78	4.659333

The secondary triangulation—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Stack, 1907	42 25 00.206	6.4	167 36 51.35	347 33 47.03	Bald	28941.08	4.4615147
	124 17 04.139	94.6	238 41 36.86	58 58 01.82	Squirrel	38896.40	4.5899094
Craggy, 1907	42 20 26.761	825.7	114 30 36.86	294 21 29.74	Stack	20397.06	4.3095676
	124 03 32.423	742.2	146 06 02.30	325 53 49.66	Bald	44271.02	4.6461195
			207 15 32.16	27 22 48.34	Squirrel	32155.68	4.5072576
Bosley, 1907	42 12 34.365	1060.3	167 51 53.54	347 49 27.84	Stack	23540.67	4.3718189
	124 13 27.700	635.4	213 13 34.43	33 27 31.50	Squirrel	51645.44	4.7130820
			223 02 49.56	43 09 30.00	Craggy	19963.09	4.3002278
Sundown 2, 1907	42 18 39.099	1206.4	204 29 20.26	24 31 58.14	Stack	12923.81	4.1113905
	124 20 58.445	1338.5	317 24 16.91	137 29 20.03	Bosley	15276.93	4.1840361
Grizzly, 1907	42 23 51.572	1591.3	252 07 46.73	72 11 00.75	Stack	6911.31	3.8395603
	124 21 51.835	1185.5	331 01 35.95	151 07 15.26	Bosley	23873.53	4.3779167
			352 46 19.26	172 46 55.23	Sundown 2	9718.53	3.9876006
Pollywog, 1913	42 11 53.015	1635.7	94 59 23.31	274 52 10.16	Bosley	14847.11	4.1716419
	124 02 42.911	984.5	140 59 59.61	320 50 19.91	Stack	31289.40	4.4953973
			175 54 36.87	355 54 03.57	Craggy	15892.07	4.2011805
Elk, 1913	42 01 52.188	1610.2	157 02 19.53	336 58 14.03	Bosley	21524.04	4.3329239
	124 07 21.656	498.2	199 01 51.71	19 04 58.64	Pollywog	19612.72	4.2925378
Pack Saddle, 1913	42 01 51.972	1603.5	90 04 43.16	270 00 04.27	Elk	9581.88	3.9814508
	124 00 25.116	577.8	137 51 53.86	317 43 08.99	Bosley	26758.50	4.4274617
			170 19 32.16	350 17 59.75	Pollywog	18812.76	4.2744526
High Divide, 1913	41 54 26.743	825.1	157 50 06.06	337 47 23.28	Elk	14842.40	4.1715040
	124 03 18.230	420.2	196 09 55.71	16 11 51.48	Pack Saddle	14303.33	4.1554370
Long Ridge, 1913	41 55 03.031	93.5	84 06 25.52	264 01 13.43	High Divide	10825.21	4.0344362
	123 55 31.032	715.1	127 43 06.84	307 35 10.58	Elk	20665.31	4.3152420
			151 48 26.16	331 45 08.48	Pack Saddle	14319.14	4.1559170
Bald Hill, 1913	41 45 38.401	1184.7	172 59 30.77	352 58 32.77	High Divide	16423.58	4.2154679
	124 01 51.288	1184.8	206 41 47.32	26 46 00.96	Long Ridge	19504.78	4.2901410
Gordon, 1913	41 48 00.303	9.3	72 08 52.99	252 02 22.08	Bald Hill	14239.10	4.1534824
	123 52 04.575	105.6	127 33 34.77	307 26 05.28	High Divide	19586.29	4.2919522
			159 57 38.64	339 55 20.87	Long Ridge	13884.38	4.1425265
Child, 1913	41 42 12.100	373.3	177 23 34.84	357 23 26.49	Bald Hill	6371.38	3.8042332
	124 01 38.743	895.8	230 56 44.22	51 03 06.56	Gordon	17069.89	4.2322307
Rattle, 1914	41 37 30.317	935.3	142 45 25.97	322 42 15.89	Child	10924.11	4.0383860
	123 56 52.807	1222.4	198 53 48.46	18 57 00.25	Gordon	20546.61	4.3127402
Red Mountain, 1913	41 31 29.256	902.6	153 16 01.72	333 11 14.71	Child	22213.77	4.3466223
	123 54 26.568	616.0	158 35 33.30	338 30 37.79	Bald Hill	28146.47	4.4494239
			163 05 46.77	343 04 09.73	Rattle	11642.90	4.0660612
			186 07 10.26	6 08 44.65	Gordon	30751.18	4.4878618
Mound, 1914	41 33 31.106	959.6	237 10 05.14	57 15 33.52	Rattle	13628.42	4.1344456
	124 05 07.486	173.5	284 08 28.19	104 15 33.22	Red Mountain	15324.15	4.1853768
Klamath South 2, 1914	41 31 56.380	1739.4	164 25 18.17	344 24 54.85	Mound	3033.87	3.4819974
	124 04 32.326	749.4	225 53 43.84	45 58 48.80	Rattle	14814.06	4.1706742
			273 21 15.05	93 27 56.66	Red Mountain	14068.69	4.1482537
Flint Rock 2, 1914	41 31 29.990	925.2	177 15 58.78	357 15 53.68	Mound	3740.79	3.5729633
	124 04 59.787	1386.2	218 01 18.40	38 01 36.61	Klamath South 2	1033.52	3.0143189
Flint Ridge, 1872	41 31 31.492	971.5	86 25 15.18	266 24 54.02	Flint Rock 2	741.39	2.8700489
	124 04 27.872	646.2	166 01 51.15	346 01 24.88	Mound	3802.73	3.5800956
			172 20 27.57	352 20 24.62	Klamath South 2	774.75	2.8891597
High Bluff, 1871	41 30 43.452	1340.5	166 02 39.27	346 02 29.07	Flint Rock 2	1479.40	3.1700648
	124 04 44.398	1029.6	194 29 43.14	14 29 54.10	Flint Ridge, 1872	1530.78	3.1849123
Supplementary points.							
Yaquina Head Lighthouse, 1908	44 40 37.967	1172.0	194 37 25.0	14 38 38.4	Foulweather	9095.3	3.958818
	124 04 42.826	943.2	229 41 23.5	49 42 30.5	Iron	2750.9	3.439472
			320 58 01.0	141 07 54.4	Table	29673.3	4.472366
Life, 1908	44 35 17.474	539.4	174 19 48.1	354 19 16.8	Yaquina Head Lighthouse	9941.6	3.997455
	124 03 58.231	1284.5	185 27 37.4	5 28 13.0	Iron	11725.4	4.069129
			306 37 39.8	126 47 01.4	Table	22057.3	4.343552
Yaquina Lighthouse, old tower, 1908	44 37 28.640	884.0	183 53 30.6	3 54 02.5	Foulweather	14678.3	4.166676
	124 03 43.722	963.8	185 57 46.6	5 58 12.0	Iron	7664.9	3.884507
			314 42 56.5	134 52 08.1	Table	24234.9	4.384442
			4 31 12.3	184 31 02.1	Life	4061.4	3.608671
Euchre Mountain, 1908	44 50 08.193	252.9	200 15 30	20 18 35	Bald	16573.8	4.219421
	123 52 12.293	270.1	357 02 52	177 03 59	Table	40732.2	4.609938
			29 32 34	209 24 18	Life	31582.1	4.499441
			42 23 25	222 15 44	Iron	21401.5	4.330445
			163 01 22	342 57 15	Cascade	26283.4	4.419682
Hill, first east of Yaquina Lighthouse, 1908	44 40 33.570	1036.2	221 25 37	41 26 31	Iron	2554.4	3.407292
	124 04 24.317	535.6	321 25 21	141 35 01	Table	29312.2	4.467048
			356 37 29	176 37 48	Life	9774.0	3.990074

The secondary triangulation—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Grass Mountain, 1908	44 25 22.31	688.6	49 15 12	229 00 09	Fairview	37846.4	4.578025
	123 40 28.10	621.7	111 07 00	290 59 53	Table	14436.9	4.159474
			141 20 43	321 04 55	Foulweather	47549.3	4.677144
Cape Lookout, summit, 1908	45 21 49.696	1534.2	239 00 04	59 08 30	Ginger	18026.9	4.255920
	123 55 44.844	976.0	336 52 57	156 55 09	Buzzard Butte	10302.7	4.012952
			346 27 14	166 32 42	Bald	43380.1	4.647188
			355 52 24	175 52 54	Round Top	16180.0	4.208978
Bill, 1907	43 00 57.102	1762.1	254 15 39.1	74 25 15.2	Sugar	19845.0	4.297651
	124 18 43.282	980.1	333 20 19.8	153 21 54.9	Bennett	7047.1	3.848013
Edson, 1907	42 52 22.415	691.7	186 12 37.1	6 13 29.1	Bill	15976.4	4.203479
	124 19 59.602	1352.8	207 02 15.4	27 04 42.4	Bennett	10761.8	4.031883
			224 23 51.4	44 34 18.8	Sugar	29769.3	4.473775
Cotton, 1907	42 57 23.382	721.5	260 09 47.8	80 10 39.3	Bennett	1737.1	3.239813
	124 17 39.281	890.3	18 55 48.3	198 54 12.8	Edson	9817.6	3.992003
Coquille River Lighthouse, 1907	43 07 27.808	858.1	323 00 12.5	143 04 46.4	Bill	15088.6	4.178648
	124 25 24.242	548.0	326 15 55.1	146 22 04.0	Bennett	22058.8	4.343581
			330 31 15.0	150 36 32.3	Cotton	21416.6	4.330750
			345 13 24.7	165 17 06.1	Edson	28890.7	4.460759
Camas, U. S. G. S.,[1] 1907	43 00 07.193	220.0	173 46 13	353 46 13	Camas	5.982	0.77685
	123 46 38.914	881.4					
Rocky Peak, 1906	42 39 37.810	1166.7	182 37 33.5	2 38 05.8	Edson	23618.7	4.373256
	124 20 47.277	1076.7	190 12 15.6	10 15 14.7	Bennett	33713.5	4.527804
			349 19 46.9	169 22 17.8	Stack	27554.1	4.440186
			136 27 29.6	316 26 56.1	Bald	1635.2	3.213573
Saddle Mountain, 1907	42 24 09.007	277.9	97 02 14.3	276 55 53.9	Stack	12991.5	4.113658
	124 07 40.213	919.6	147 28 25.0	327 18 59.4	Bald	35427.7	4.549343
			320 23 38.5	140 26 25.5	Craggy	8897.7	3.949277
Tower Rock, 1907	42 52 35.122	1083.8	247 17 30.4	67 28 32.8	Bennett	23902.2	4.378437
	124 32 36.566	830.0	1 37 50.8	181 37 47.7	Sixes	3557.9	3.551189
			21 23 13.2	201 22 21.9	Cape	4693.4	3.671484
Colliers Butte, 1907	42 21 56.586	1746.0	24 42 26.3	204 38 32.3	Bosley	19090.3	4.280813
	124 07 39.848	911.8	113 45 07.6	293 38 47.2	Stack	14095.9	4.149093
			150 41 51.5	330 32 26.0	Bald	39938.8	4.590383
			163 24 35.8	343 16 14.4	Edson	58807.5	4.769433
Pilot Knob, 1907	42 50 18.556	572.6	115 15 50.8	295 11 47.8	Edson	8966.4	3.952619
	124 14 02.349	53.3	166 33 12.0	346 31 35.7	Bennett	13784.5	4.139391
			282 27 21.9	102 33 06.4	Johnson	11788.9	4.071474
Salmon Mountain, 1907	42 46 19.368	597.6	54 50 16.0	234 42 22.8	Bald	19426.3	4.288391
	124 09 59.310	1348.4	104 41 32.9	284 26 07.4	Sixes	31967.0	4.504702
			231 03 59.2	51 19 52.2	Camas	40775.9	4.610403
			157 15 40.4	337 11 18.8	Bennett	22544.4	4.353039
Mount Chetco or Mount Emery,[1] 1907	42 06 20.19	622.9	152 18 44.5	332 15 47.2	Bosley	13040.6	4.115299
	124 09 03.55	81.6	196 10 48.3	16 14 30.8	Craggy	27202.0	4.434601
Red Mountain,[1] 1907	42 08 27.40	845.4	109 41 44.8	289 31 19.1	Bosley	22705.3	4.356128
	123 57 55.80	1281.4	160 51 26.2	340 47 39.8	Craggy	23499.2	4.371053
Island Rock,[1] 1907	42 40 01.75	54.1	165 31 16	345 30 12	Port Orford astronomic	8514.7	3.930168
	124 28 31.72	722.3	267 15 23	87 20 04	Bald	9460.3	3.975906
Sister Rock,[1] 1907	42 35 41.05	1266.7	203 56 32	23 58 24	Bald	9291.3	3.968078
	124 24 22.33	509.0	351 03 52	171 05 34	Grizzly	22159.7	4.345564
Small hill southwest of Bosley, 1913	42 07 37.968	1171.5	181 03 52	1 03 57	Bosley	9146.7	3.961264
	124 13 35.106	806.3	242 12 45	62 20 03	Pollywog	16913.9	4.228244
			321 08 39	141 12 50	Elk	13693.3	4.136509
St. Georges Reef Lighthouse, 1913	41 50 14.693	453.3	196 40 30.37	16 46 31.78	Bosley	43159.19	4.6350733
	124 22 27.574	636.2	224 02 20.64	44 12 26.04	Elk	29978.15	4.4768049
			234 39 04.85	54 53 48.62	Pack Saddle	37296.96	4.5716734
			253 32 31.11	73 45 18.26	High Divide	27621.82	4.4412523
Bear Mountain, 1913	41 47 47.761	1473.5	111 14 40	290 59 18	High Divide	34168.0	4.533620
	123 40 16.503	381.0	124 58 26	304 40 20	Elk	45623.3	4.659187
			133 11 30	312 58 03	Pack Saddle	38134.1	4.581314
Preston Peak, 1914	41 50 08.065	248.8	35 39 01	215 27 12	Red Mountain	42425.4	4.627626
	123 36 40.063	924.4	50 16 54	230 03 27	Rattle	36498.4	4.562274
			67 09 05	246 52 27	Child	37601.9	4.575210
			79 37 09	259 26 54	Gordon	21699.1	4.336441
			198 10 28	18 25 52	Onion	100216.0	5.000937
			251 09 12	71 38 15	Sterling	63419.8	4.802225
Second Peak north of Preston Peak, 1914	41 52 10.179	314.0	70 13 33	250 03 16	Gordon	22692.7	4.355887
	123 36 39.595	913.1	96 40 12	276 22 24	High Divide	37096.2	4.569330
			118 47 52	298 31 58	Pack Saddle	37419.5	4.573098
Preston Peak, south, 1914	41 50 00.703	21.7	36 00 09	215 48 15	Red Mountain	42332.4	4.626673
	123 36 33.305	768.5	50 42 50	230 29 18	Rattle	36474.1	4.561985
			67 33 48	247 17 05	Child	37658.2	4.575859

[1] No check on this position.

The secondary triangulation—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Four Brothers, No. 1, 1914	41 44 59.702	1841.9	75 40 12	255 30 32	Child	20777.2	4.317688
	123 47 08.085	186.8	128 05 44	307 54 57	High Divide	28412.2	4.453505
			149 36 13	329 27 19	Pack Saddle	36235.6	4.559135
Four Brothers, No. 2, 1914	41 44 22.008	679.0	78 38 03	258 28 33	Child	20198.3	4.305315
	123 47 22.297	515.3	130 18 36	310 07 59	High Divide	28892.9	4.460791
			150 56 52	330 48 08	Pack Saddle	37082.7	4.569171
Four Brothers, No. 3, 1914	41 44 10.405	321.0	22 17 14	202 12 38	Red Mountain	25371.3	4.404342
	123 47 31.561	729.4	46 29 42	226 23 29	Rattle	17912.9	4.253165
			79 31 14	259 21 50	Child	19920.2	4.299293
			131 07 20	310 56 49	High Divide	28964.2	4.461861
Four Brothers, No. 4, 1914	41 43 43.094	1329.5	22 33 42	202 29 13	Red Mountain	24509.4	4.389333
	123 47 40.975	947.0	48 01 54	227 55 48	Rattle	17181.2	4.235054
			81 49 45	261 40 28	Child	19568.9	4.291566
			132 38 18	312 27 54	High Divide	29364.6	4.467824
Rock, 1914	41 34 46.403	1431.6	323 24 27.3	143 26 18.7	Klamath South 2	6531.7	3.815023
	124 07 20.282	469.9	326 22 49.9	146 24 44.3	Flint Ridge	7219.6	3.858514
			331 44 08.9	151 45 42.1	Flint Rock 2	6878.8	3.837515
			334 14 57.7	154 16 41.2	High Bluff	8320.5	3.920150
Peak, No. 6,[1] 1914	41 39 52.78	1628.3	53 59 42	233 49 31	Red Mountain	26371.8	4.421140
	123 39 06.42	148.5	79 59 59	259 48 11	Rattle	25067.0	4.399103
Sawtooth, North,[1] 1914	41 36 52.35	1615.1	58 49 24	238 41 33	Red Mountain	19218.5	4.283720
	123 42 37.37	865.2	93 27 49	273 18 21	Rattle	19839.0	4.297519
Sawtooth, South,[1] 1914	41 36 46.33	1429.3	59 14 48	239 06 58	Red Mountain	19093.8	4.280892
	123 42 38.84	899.3	94 00 18	273 50 51	Rattle	19817.1	4.297039
Peak, No. 8,[1] 1914	41 33 04.44	137.0	75 07 33	255 02 18	Red Mountain	11407.6	4.057193
	123 46 31.03	719.1	119 43 13	299 36 21	Rattle	16573.8	4.219422
Redding Rock Lighthouse, 1914	41 20 26.735	824.8	201 04 58.42	21 08 43.62	Flint Rock 2	21934.11	4.3411200
	124 10 40.095	932.2	201 49 58.05	21 54 01.44	Klamath South 2	22925.07	4.3603107
			202 49 00.76	22 53 07.08	Flint Ridge	22254.45	4.3474169
			203 26 01.20	23 29 56.55	High Bluff	20741.26	4.3168352
			211 12 55.08	31 22 03.08	Rattle	36953.26	4.5676528

Columbia River to Tillamook Bay.

Principal points.							
Redwood, 1875	45 41 49.839	1538.7	176 27 57.5	356 27 46.8	Neahkahnie	5234.6	3.718890
	123 56 12.199	263.9	299 19 05.1	119 23 59.5	Foley	10219.4	4.009425
Fishery, 1875	45 41 20.587	635.6	132 02 01.3	312 01 28.2	Redwood	1348.9	3.129989
	123 55 25.890	560.2	167 48 36.8	347 47 53.0	Neahkahnie	6269.2	3.797212
Seely, 1875	45 42 39.637	1223.8	176 35 51.1	356 35 43.9	Neahkahnie	3693.6	3.567455
	123 56 16.985	367.4	3.5 37 40.5	155 38 17.1	Fishery	2679.2	3.428010
			356 08 50.6	176 08 54.0	Redwood	1540.9	3.187784
Landing, 1875	45 39 53.751	1659.5	168 08 58.4	348 08 33.5	Redwood	3662.1	3.563733
	123 55 37.439	810.4	185 19 32.1	5 19 40.3	Fishery	2692.5	3.430162
Point, 1875	45 40 12.394	382.7	178 42 10.7	358 42 08.4	Redwood	3009.2	3.478454
	123 56 09.051	195.9	203 55 18.1	23 55 49.0	Fishery	2303.2	3.362341
			310 03 54.5	130 04 17.1	Landing	894.2	2.951423
Keaton, 1875	45 38 37.400	1154.7	182 39 12.2	2 39 21.3	Redwood	5947.6	3.774342
	123 56 24.926	540.0	186 40 57.3	6 41 08.7	Point	2962.9	3.470242
			194 13 38.9	14 14 21.2	Fishery	5197.7	3.715809
			203 33 40.5	23 34 14.5	Landing	2571.7	3.410217
Carlton, 1875	45 44 54.592	1685.5	334 30 51.2	154 32 35.4	Fishery	7318.5	3.864421
	123 57 51.420	1111.4	339 22 30.8	159 23 41.9	Redwood	6094.2	3.784919
			345 43 47.2	165 45 00.6	Point	8989.4	3.953733
Sherman, 1874	46 08 57.251	1767.7	153 17 31.4	333 13 30.3	Battery	15912.2	4.201731
	123 57 17.829	382.6	193 58 17.1	13 59 58.7	Scarboro Hill 2	12483.6	4.096340
Boom, 1874	46 07 03.681	113.7	155 18 33.4	335 13 58.8	Battery	19505.7	4.290161
	123 56 31.298	672.1	164 06 17.9	344 05 44.4	Sherman	3646.1	3.561824
			187 21 32.9	7 22 40.9	Scarboro Hill 2	15750.2	4.197286
Morrison, 1874	46 06 58.180	1796.4	99 31 01.7	279 30 27.7	Boom	1027.7	3.011863
	123 55 44.096	946.9	151 19 01.3	331 17 53.7	Sherman	4191.0	3.622320
			152 53 42.7	332 48 34.1	Battery	20101.3	4.303224
			183 38 49.4	3 39 23.5	Scarboro Hill 2	15822.1	4.199264
Goodwin, 1874	46 05 10.883	336.0	154 28 29.6	334 27 33.8	Boom	3859.7	3.586550
	123 55 13.843	297.4	168 54 20.5	348 53 58.7	Morrison	3376.0	3.528404
Lake, 1874	46 04 59.607	1840.4	167 27 13.4	347 26 44.8	Boom	3924.7	3.593903
	123 55 51.594	1108.6	182 31 05.1	2 31 10.5	Morrison	3664.6	3.564026
			246 45 52.9	66 46 20.1	Goodwin	887.2	2.945793

[1] No check on this position.

Columbia River to Tillamook Bay—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Condit, 1874	46 03 25.781	796.0	157 57 50.5	337 57 11.2	Lake	3125.4	3.494901
	123 54 57.019	1225.6	173 38 38.9	353 38 26.8	Goodwin	3265.2	3.513908
Callender, 1874	46 03 47.042	1452.4	172 36 38.5	352 36 28.8	Lake	2259.3	3.353966
	123 55 38.071	818.3	191 22 09.2	11 22 26.7	Goodwin	2640.5	3.421684
			306 38 34.3	126 39 03.9	Condit	1099.8	3.041317
Gearhart, 1874	46 01 37.104	1145.6	176 57 49.1	356 57 42.0	Callender	4017.5	3.603960
	123 55 28.170	605.7	191 17 08.8	11 17 31.2	Condit	3421.6	3.534234
Meadow, 1874	46 01 42.929	1325.4	62 55 41.4	242 55 29.6	Gearhart	395.1	2.596743
	123 55 11.811	254.0	171 37 16.6	351 36 57.7	Callender	3873.4	3.588095
Loomis, 1874	46 00 33.994	1049.6	163 08 20.9	343 08 01.1	Gearhart	2036.1	3.308796
	123 55 00.712	15.3	173 36 01.8	353 35 53.8	Meadow	2141.7	3.330763
Grimes, 1874	46 00 04.834	149.2	182 36 58.7	2 37 03.0	Gearhart	2851.8	3.455126
	123 55 34.223	736.4	218 41 08.3	38 41 32.4	Loomis	1153.5	3.062005
Dunce, 1874	45 58 33.180	1024.4	199 54 09.5	19 55 18.3	Gearhart	6039.8	3.781020
	123 57 03.767	81.1	214 14 51.5	34 15 55.9	Grimes	3423.7	3.534502
Rivulet, 1874	45 58 25.885	799.2	204 14 49.9	24 16 18.8	Gearhart	6475.8	3.811291
	123 57 31.820	685.0	219 37 45.6	39 39 10.2	Grimes	3967.3	3.598496
			249 32 39.2	69 32 59.4	Dunce	644.6	2.809259
Cliff, 1874	45 58 05.576	172.2	208 27 46.8	28 29 45.2	Gearhart	7430.1	3.870994
	123 58 12.813	275.9	222 02 21.6	42 04 39.8	Loomis	6171.9	3.790422
			222 48 59.9	42 50 54.0	Grimes	5021.0	3.700786
Ledge, 1874	45 58 11.379	351.3	207 44 34.8	27 46 26.5	Gearhart	7177.8	3.855994
	123 58 03.525	75.9	222 31 04.7	42 32 52.1	Grimes	4753.7	3.677030
			236 43 31.2	56 43 54.0	Rivulet	816.4	2.911903
Supplementary points.							
Islet 1, 1874	45 56 48.948	1511.3	173 40 02.7	353 37 45.6	Battery	36923.8	4.567306
	123 59 41.636	896.8	189 59 17.2	10 02 42.2	Scarboro Hill 2	35135.8	4.545750
			192 09 04.6	12 11 21.6	Boom	19416.5	4.288171
			198 04 03.0	18 06 48.5	Lake	15937.1	4.202408
			202 04 17.6	22 07 12.8	Callender	13932.0	4.144012
			211 29 26.6	31 32 28.9	Gearhart	10436.3	4.018545
Islet 2, 1874	45 56 46.927	1448.9	173 45 22.1	353 43 06.7	Battery	36980.1	4.567968
	123 59 44.004	947.8	190 03 06.4	10 06 33.2	Scarboro Hill 2	35206.1	4.546618
			192 15 31.7	12 17 50.4	Boom	19488.3	4.289773
			198 10 16.8	18 13 04.0	Lake	16012.2	4.204451
Pinnacle Rock, 1874	45 56 49.184	1518.6	191 36 39.5	11 38 50.1	Boom	19370.5	4.287140
	123 59 32.860	707.7	197 25 43.3	17 28 22.4	Lake	15872.5	4.200645
			201 21 36.7	21 24 25.6	Callender	13855.3	4.141615
			210 37 10.8	30 40 06.8	Gearhart	10332.5	4.014206
Dexter,[1] 1874	45 58 35.387	1092.6	86 26 18.5	266 25 42.0	Dunce	1095.1	3.039469
	123 56 12.994	279.7	189 44 59.1	9 45 31.3	Gearhart	5692.9	3.755330
Flagstaff, 1874	45 58 51.142	1579.0	68 11 41.1	248 10 54.8	Dunce	1492.5	3.173926
	123 55 59.396	1278.6	187 28 00.9	7 28 23.4	Gearhart	5168.0	3.713321
Sea-Side House, cupola,[1] 1874	45 58 43.081	1330.1	79 46 51.1	259 45 54.5	Dunce	1721.7	3.235968
	123 55 45.057	970.0	183 52 02.0	3 52 14.1	Gearhart	5385.3	3.731207
Tillamook Rock Lighthouse, 1909	45 56 15.939	492.1	176 31 27.2	356 30 10.0	Battery	37786.1	4.577332
	124 01 04.858	104.7	192 28 03.0	12 32 27.9	Scarboro Hill 2	36484.8	4.562112
			232 51 45.2	52 54 00.7	Tillamook Head	5090.3	3.706740
Outermost Rock of Tillamook Bay,[1] 1875.	45 29 41.52	1281.8	189 20 08	9 22 10	Redwood	22788.2	4.357710
	123 59 03.06	66.4	190 56 40	10 58 45	Point	19838.8	4.297516
Eastern Peak Double Rock,[1] 1875	45 34 05.98	184.6	188 41 58	8 43 10	Redwood	14487.9	4.161004
	123 57 53.48	1159.7	191 18 00	11 19 15	Point	11536.4	4.062070
Flagstaff,[1] 1875	45 39 16.23	501.1	169 27 36	349 27 25	Point	1763.8	3.246442
	123 55 54.15	1172.5	197 20 17	17 20 29	Landing	1213.6	3.084066
Middle Peak Neahkahnie, 1875	45 44 38.089	1176.0	260 38 27	80 38 33	Neahkahnie	188.0	2.27418
	123 56 35.709	771.9	351 49 23	171 50 04	Landing	8868.5	3.94785
			354 24 27	174 24 43	Redwood	5219.3	3.71761
			355 58 34	175 58 53	Point	8223.2	3.91504
Southwest Peak Neahkahnie, 1875	45 44 38.583	1191.2	267 28 21	87 28 32	Neahkahnie	336.5	2.52704
	123 56 42.679	922.6	350 52 53	170 53 20	Landing	8906.4	3.94970
			352 47 09	172 47 32	Redwood	5251.3	3.72027
			354 56 17	174 56 41	Point	8251.1	3.91651
Cape Falcon Rock, 1875	45 45 52.872	1632.4	312 42 14.9	132 49 42.5	Foley	18429.2	4.265507
	123 59 46.150	997.2	328 19 23.2	148 21 56.4	Redwood	8814.8	3.945213
			335 54 33.7	155 57 09.2	Point	11512.7	4.061178
Onion Peak, 1875	45 49 00.633	19.5	345 18 01.5	165 20 40.3	Foley	18928.4	4.277113
	123 53 02.507	54.1	11 14 08.6	191 12 17.6	Landing	17213.3	4.235864
			13 54 26.2	193 52 12.6	Point	16799.9	4.225307

[1] No check on this position.

Columbia River to Tillamook Bay—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Falcon, 1875	45 45 45.575	1407.1	331 55 01.9	151 57 26.2	Fishery	9271.2	3.967135
	123 58 47.585	1028.5	335 12 16.2	155 14 07.4	Redwood	8016.2	3.903967
			341 32 58.7	161 34 52.2	Point	10842.9	4.035147
			346 50 42.0	166 52 24.1	Keaton	13574.7	4.132731
Bend,[1] 1875	45 41 17.41	537.5	106 37 56	286 36 05	Redwood	3501.0	3.544192
	123 53 37.15	803.9	149 27 21	329 25 19	Neahkahnie	7230.1	3.859147
Large rock off Carlton,[1] 1875	45 45 05.18	159.9	338 02 50	158 04 10	Redwood	6501.9	3.813037
	123 58 04.55	98.3	344 32 22	164 33 45	Point	9378.2	3.972119
A,[1] 1875	45 47 20.40	629.8	358 58 41	178 58 49	Landing	13791.9	4.139625
	123 55 48.80	1054.1	1 53 59	181 53 45	Point	13221.4	4.121278
E,[1] 1875	45 47 17.59	543.1	6 20 50	186 19 59	Landing	13787.2	4.139476
	123 54 27.03	583.8	9 32 58	189 31 45	Point	13311.4	4.124223
F,[1] 1875	45 48 38.58	1191.1	7 52 13	187 50 59	Landing	16357.1	4.213706
	123 53 53.97	1165.2	10 35 52	190 34 15	Point	15898.3	4.201351
Hill a,[1] 1875	45 47 24.03	741.9	331 19 00	151 23 37	Foley	17465.7	4.242187
	123 55 47.84	1033.2	9 28 00	189 27 32	Neahkahnie	5163.4	3.712934
Hill b,[1] 1875	45 47 18.90	583.5	333 28 27	153 32 37	Foley	16949.2	4.229150
	123 55 10.27	221.8	18 36 27	198 35 32	Neahkahnie	5206.6	3.716556
Hill c,[1] 1875	45 45 29.89	922.8	327 25 28	147 29 37	Foley	14002.4	4.146202
	123 55 08.86	191.5	47 09 28	227 08 32	Neahkahnie	2307.3	3.363109

Tillamook Bay.

Principal points.							
Doty, 1908	45 32 13.758	424.7	316 40 13.6	136 45 23.0	Ginger	13738.7	4.137946
	123 51 07.607	165.0	42 03 24.2	222 01 52.6	Shell Point	4156.8	3.618756
			45 50 44.8	225 47 57.0	Boulder Point	7117.2	3.852307
Green Hill 2, 1908	45 33 44.811	1383.4	294 21 57.2	114 25 21.2	Doty	6806.2	3.832907
	123 55 53.361	1157.3	309 17 08.6	129 25 41.9	Ginger	20203.2	4.305421
			329 53 55.7	149 55 48.1	Shell Point	6816.3	3.833550
			351 57 12.1	171 57 48.2	Boulder Point	7848.1	3.894762
Pitcher Point, 1866	45 30 25.282	780.5	187 48 21.5	7 48 49.3	Green Hill 2	6217.6	3.793626
	123 56 32.300	701.1	266 27 53.1	86 30 13.2	Shell Point	4272.0	3.630628
			309 38 26.9	129 39 30.8	Boulder Point	2524.6	3.402191
Tillamook Bay west base, 1866	45 30 10.264	316.9	67 34 35.9	247 33 04.6	Boulder Point	3006.1	3.478002
	123 52 54.797	1189.7	147 45 40.2	327 45 25.1	Shell Point	857.9	2.933431
Rock Point, 1866	45 29 04.669	144.1	133 05 32.5	313 05 01.7	Boulder Point	1285.0	3.108888
	123 54 19.555	424.7	206 40 45.0	26 41 30.4	Shell Point	3078.6	3.488352
			222 15 24.6	42 16 25.1	Tillamook Bay west base	2736.4	3.437183
Mud, 1866	45 29 27.668	854.2	70 43 22.0	250 42 15.3	Rock Point	2149.7	3.332372
	123 52 46.120	1001.4	93 14 58.1	273 13 20.6	Boulder Point	2972.0	3.473046
			171 50 54.3	351 50 48.1	Tillamook Bay west base	1328.5	3.123349
Slough, 1866	45 29 20.626	636.8	79 55 29.8	259 53 58.7	Rock Point	2812.4	3.449077
	123 52 12.045	261.6	106 22 32.5	286 22 08.2	Mud	771.2	2.887178
			148 47 57.3	328 47 26.8	Tillamook Bay west base	1791.6	3.253253
Tillamook Bay east base, 1866	45 30 10.968	338.6	351 26 22.1	171 26 29.8	Slough	1571.7	3.196364
	123 52 22.818	495.4	20 43 56.8	200 43 40.2	Mud	1429.3	3.155131
			88 12 32.7	268 12 09.9	Tillamook Bay west base	694.588	2.841727
Sand (1908), 1908	45 32 57.737	1782.5	225 01 42.9	45 02 30.8	Green Hill 2	2056.6	3.313143
	123 57 00.448	9.7	280 01 23.2	100 05 35.1	Doty	7774.3	3.890659
Pyramid Rock, 1908	45 29 46.512	1435.9	203 59 24.2	24 00 50.6	Sand (1908)	6462.4	3.810304
	123 59 01.573	34.2	209 01 05.5	29 03 19.8	Green Hill 2	8414.6	3.925032
			246 06 46.8	66 12 25.0	Doty	11221.1	4.050036
Spit, 1908	45 32 56.737	1751.6	102 07 17.2	282 07 12.5	Sand (1908)	147.1	2.167569
	123 56 53.819	1167.4	221 27 18.8	41 28 02.0	Green Hill 2	1980.5	3.296777
			25 17 07.0	205 15 35.8	Pyramid Rock	6494.3	3.812533
Cape Mears Lighthouse, 1908	45 29 13.038	402.5	154 27 04.0	334 26 47.8	Pyramid Rock	1145.5	3.058978
	123 58 38.821	843.0	197 05 51.9	17 07 02.0	Sand (1908)	7258.2	3.860828
			198 15 08.0	18 16 22.9	Spit	7272.5	3.861681
Stump, 1866	45 29 38.402	1185.6	64 49 25.4	244 49 02.3	Mud	778.9	2.891466
	123 52 13.659	296.6	137 45 52.5	317 45 23.2	Tillamook Bay west base	1328.7	3.123416
			168 48 44.6	348 48 38.1	Tillamook Bay east base	1024.9	3.010678
Sandstone Point, 1866	45 31 48.683	1503.0	340 57 59.3	160 58 25.5	Shell Point	2446.5	3.388549
	123 53 52.633	1142.2	19 59 39.0	199 58 49.0	Boulder Point	4454.0	3.648748
			53 24 12.9	233 22 19.0	Pitcher Point	4317.2	3.635207

[1] No check on this position.

Tillamook Bay—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Flat, 1866	45 32 10.820	334.0	281 39 34.9	101 41 23.7	Sandstone Point	3377.3	3.528574
	123 56 25.062	543.8	2 45 39.0	182 45 33.9	Pitcher Point	3262.0	3.513484
Memalust Head, 1866	45 32 52.465	1619.7	341 10 28.5	161 10 50.6	Sandstone Point	2080.4	3.318140
	123 54 23.569	511.2	31 35 43.4	211 34 11.6	Pitcher Point	5333.9	3.727048
			64 00 34.9	243 59 08.2	Flat	2932.6	3.467258
Sand Hill, 1866	45 33 02.541	78.4	276 12 24.7	96 13 58.6	Memalust Head	2871.1	3.458052
	123 56 35.147	762.4	352 11 47.6	172 11 54.8	Flat	1611.7	3.207279
Bailey Point, 1866	45 33 28.030	865.4	311 45 18.6	131 45 59.1	Memalust Head	1648.6	3.217107
	123 55 20.262	439.4	30 32 06.7	210 31 20.6	Flat	2767.3	3.442055
			64 09 31.4	244 08 38.0	Sand Hill	1804.9	3.256444
Green Hill, 1866	45 33 45.257	1397.2	309 53 37.4	129 54 41.5	Memalust Head	2540.7	3.404955
	123 55 53.429	1158.7	13 14 48.3	193 14 25.7	Flat	2995.2	3.476422
			34 27 33.0	214 27 03.2	Sand Hill	1599.3	3.203936
Brush, 1866	45 32 06.014	185.7	299 24 18.7	119 27 04.6	Shell Point	5706.2	3.763146
	123 57 08.493	184.3	329 57 23.2	149 58 52.9	Boulder Point	5452.8	3.736619
			345 49 15.0	165 49 40.8	Pitcher Point	3207.5	3.506170
Middle, 1866	45 31 10.126	312.6	213 35 52.1	33 36 33.0	Flat	2249.7	3.352128
	123 57 22.438	487.0	230 50 05.4	50 52 13.1	Memalust Head	5004.5	3.699364
			321 49 28.0	141 50 03.8	Pitcher Point	1761.0	3.245760
Sand, 1866	45 33 23.691	731.4	231 39 31.6	51 39 59.3	Green Hill	1073.3	3.030741
	123 56 32.248	699.5	289 02 29.2	109 04 01.0	Memalust Head	2953.0	3.470261
			5 30 05.1	185 30 03.0	Sand Hill	656.0	2.816895
Supplementary points.							
Bailey's house, southeast gable, 1866	45 33 27.903	861.4	314 16 16.9	134 16 53.8	Memalust Head	1567.2	3.195114
	123 55 15.298	331.8	329 38 40.4	149 39 39.4	Sandstone Point	3549.5	3.550173
			32 27 38.6	212 26 48.8	Flat	2820.2	3.450281
New house, near Bailey's, east gable, 1866.	45 33 30.563	943.6	323 10 59.6	143 11 28.6	Memalust Head	1469.2	3.167067
	123 55 04.154	90.1	35 29 37.6	215 28 40.0	Flat	3023.5	3.480506
			77 22 56.2	257 22 44.7	Bailey Point	358.0	2.553898
Morgan's new barn, south gable, 1866	45 30 14.795	456.8	49 27 52.4	229 26 29.3	Rock Point	3330.3	3.522485
	123 52 23.008	499.5	78 32 41.6	258 32 19.0	Tillamook Bay west base	704.1	2.847658
			117 02 32.4	297 01 54.7	Shell Point	1288.6	3.110102
House No. 6, 1866	45 28 41.257	1273.7	297 59 12.9	28 00 00.9	Tillamook Bay west base	3112.0	3.493036
	123 54 02.063	44.8	229 00 33.1	49 01 27.3	Mud	2184.7	3.339398
			233 08 28.8	53 09 46.1	Stump	2941.8	3.468620
House No. 3, south gable, 1866	45 29 09.261	285.9	119 16 22.3	299 15 49.0	Mud	1162.4	3.065337
	123 51 59.427	1290.6	147 27 08.8	327 26 29.3	Tillamook Bay west base	2234.3	3.349148
			165 04 26.8	345 04 10.1	Tillamook Bay east base	1971.6	3.294820
House No. 2, north gable, 1866	45 29 10.734	331.4	117 07 34.7	297 07 15.1	Slough	669.9	2.825983
	123 51 44.591	968.3	140 19 57.9	320 19 07.8	Tillamook Bay west base	2387.8	3.377991
			155 56 58.4	335 56 31.1	Tillamook Bay east base	2036.4	3.309866
Clark's house, chimney, 1866	45 30 15.994	493.8	359 05 09.9	179 05 10.8	Slough	1709.6	3.232882
	123 52 13.300	288.7	0 23 03.6	180 23 03.3	Stump	1160.6	3.064680
			25 32 00.1	205 31 36.7	Mud	1653.4	3.218373
Log, 1866	45 30 24.940	770.0	36 03 04.6	216 02 05.4	Rock Point	3064.8	3.486406
	123 52 56.502	1226.6	59 44 14.5	239 42 44.5	Boulder Point	3174.4	3.501656
			122 56 30.1	302 56 16.3	Shell Point	501.2	2.700013
Gap, 1866	45 30 37.552	1159.3	206 17 31.3	26 18 18.1	Flat	3211.9	3.506756
	123 57 30.632	664.9	245 04 49.5	65 07 25.1	Sandstone Point	5216.1	3.717346
			271 11 05.7	91 14 07.5	Shell Point	5531.3	3.742824

Nestugga Bay.

Principal points.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Round Top, 1908	45 13 06.937	214.1	203 23 26.3	23 25 00.2	Buzzard Butte	7258.7	3.860658
	123 54 51.469	1123.0	271 49 47.1	91 56 32.6	Hebo	12473.3	4.095980
Flat, 1908	45 10 21.015	648.7	166 19 08.1	346 18 27.6	Round Top	5271.8	3.721961
	123 53 54.323	1186.3	187 54 16.8	7 55 10.1	Buzzard Butte	11896.9	4.075433
			247 10 40.4	67 16 45.2	Hebo	12173.0	4.085396
Fletcher, 1883	45 09 29.427	908.4	196 29 54.1	16 30 58.8	Round Top	7003.4	3.845306
	123 56 22.622	494.1	243 48 03.6	63 49 48.8	Flat	3609.1	3.557404
Bozley, 1883	45 09 13.150	405.9	207 24 16.3	27 26 18.0	Round Top	8130.7	3.910130
	123 57 42.985	939.0	247 13 08.1	67 15 50.4	Flat	5415.7	3.733656
			254 01 05.4	74 02 02.4	Fletcher	1525.9	3.261473
Gage B, 1908	45 11 08.964	276.7	204 39 22.0	24 40 16.5	Round Top	4007.5	3.602875
	123 56 08.091	176.6	296 51 44.9	116 53 19.9	Flat	3274.4	3.515130
			5 53 49.6	185 53 39.3	Fletcher	3089.1	3.489834
			30 06 23.8	210 05 16.5	Bozley	4132.4	3.616204

Nestugga Bay—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Haystack Rock, 1883	45 12 45.422	1402.2	263 14 16.1	83 17 19.0	Round Top	5662.0	3.752971
	123 59 09.165	200.0	269 06 53.5	89 16 41.9	Hebo	18092.1	4.257489
			302 56 17.9	123 00 01.3	Flat	8191.9	3.913382
			330 32 32.5	150 40 33.3	Bald	30243.9	4.480637
			343 58 18.5	163 59 19.6	Bozley	6817.7	3.833640
Sheep Hill, 1883	45 09 41.514	1281.6	285 44 13.8	105 44 56.8	Fletcher	1375.3	3.138382
	123 57 23.225	507.3	26 14 30.1	206 14 16.1	Bozley	976.2	2.989548
Fern Hill, 1883	45 08 54.821	1692.4	126 26 11.3	306 25 46.4	Bozley	952.7	2.978977
	123 57 07.895	172.5	166 55 25.3	346 55 14.3	Sheep Hill	1479.8	3.170211
			222 47 12.2	42 47 44.3	Fletcher	1455.8	3.163096
Goose, 1883	45 09 59.068	1823.5	357 22 11.3	177 22 12.7	Fletcher	916.0	2.961901
	123 56 24.546	536.1	25 31 26.4	205 30 55.7	Fern Hill	2197.8	3.341982
			67 05 03.9	247 04 22.3	Sheep Hill	1391.4	3.143452
Craven, 1883	45 09 58.424	1803.6	35 54 20.2	215 53 59.2	Fletcher	1105.1	3.043405
	123 55 52.950	1156.4	91 39 16.2	271 38 53.8	Goose	690.3	2.839048
Vine Maple, 1883	45 10 20.715	639.5	303 03 50.9	123 04 25.2	Craven	1261.2	3.100770
	123 56 41.346	902.9	331 13 52.1	151 14 04.0	Goose	762.3	2.882150
			345 30 58.7	165 31 12.0	Fletcher	1635.3	3.213587
Gage, 1883	45 10 33.138	1023.0	358 24 55.4	178 24 56.3	Craven	1072.0	3.030211
	123 55 54.307	1185.9	32 07 31.6	212 07 10.1	Goose	1241.8	3.094068
			69 31 53.8	249 31 20.4	Vine Maple	1096.4	3.039966
Grass, 1883	45 10 51.508	1590.1	303 53 21.6	123 53 49.0	Gage	1017.0	3.007305
	123 56 32.969	719.8	331 55 36.6	151 56 04.9	Craven	1857.2	3.268853
			10 53 32.9	190 53 27.0	Vine Maple	968.0	2.985886
Nestucca, 1883	45 09 31.691	978.3	253 10 08.1	73 10 40.7	Sheep Hill	1047.6	3.020178
	123 58 09.133	199.5	315 03 32.1	135 03 50.7	Bozley	808.6	2.907733
Point, 1883	45 10 00.658	20.3	298 54 46.6	118 55 21.3	Sheep Hill	1222.2	3.087131
	123 58 12.208	266.6	336 28 43.0	156 29 03.8	Bozley	1599.5	3.203977
			355 42 19.5	175 42 21.7	Nestucca	896.7	2.952669
Shersinger, 1883	45 09 54.941	1696.1	39 02 44.2	219 02 25.3	Nestucca	924.1	2.965720
	123 57 42.481	927.8	105 12 45.5	285 12 24.4	Point	672.8	2.827862
Beach, 1883	45 10 41.818	1291.0	332 42 49.9	152 43 21.0	Sheep Hill	2094.6	3.321102
	123 58 07.190	157.0	339 32 58.5	159 33 16.0	Shersinger	1544.4	3.188770
			4 55 45.1	184 55 41.5	Point	1275.3	3.105625
Green Bluff, 1883	45 10 19.734	609.2	29 51 47.1	209 51 32.8	Shersinger	882.6	2.945740
	123 57 22.360	488.3	61 35 35.4	241 35 00.0	Point	1237.6	3.092597
			124 51 33.4	304 51 01.6	Beach	1192.9	3.076605
Red Rock, 1883	45 10 53.886	1663.5	14 49 26.3	194 49 17.2	Green Bluff	1090.6	3.037663
	123 57 09.582	209.2	21 32 50.2	201 32 26.8	Shersinger	1956.4	3.291449
			73 30 23.7	253 29 42.8	Beach	1311.8	3.117876
Talbert, 1883	45 08 37.929	1170.9	171 52 52.4	351 52 47.4	Bozley	1098.3	3.040725
	123 57 35.884	784.0	229 32 19.2	49 32 39.0	Fern Hill	803.6	2.905061
Shortridge, 1883	45 08 54.583	1685.0	230 14 15.3	50 14 37.7	Bozley	896.2	2.952419
	123 58 14.524	317.3	269 42 11.0	89 42 58.2	Fern Hill	1455.6	3.163037
			301 20 17.9	121 20 45.3	Talbert	988.4	2.994925
Faulconer, 1883	45 08 01.989	61.4	187 18 03.6	7 18 10.3	Shortridge	1636.9	3.214016
	123 58 24.046	525.5	223 28 48.3	43 29 22.4	Talbert	1529.2	3.184454
			225 33 47.4	45 34 41.3	Fern Hill	2329.9	3.367332
Spruce, 1883	45 10 45.146	1393.7	244 00 39.9	64 00 53.0	Grass	448.2	2.651505
	123 56 51.423	1122.8	286 32 56.4	106 33 36.9	Gage	1301.0	3.114289
			318 28 36.4	138 29 17.8	Craven	1926.3	3.284727
			124 14 20.1	304 14 07.2	Red Rock	479.6	2.680862
Adler Point, 1883	45 10 55.357	1708.9	313 49 44.8	133 49 48.8	Grass	171.6	2.234452
	123 56 38.638	843.6	3 09 53.4	183 09 51.5	Vine Maple	1071.0	3.029804
			41 31 36.9	221 31 27.8	Spruce	421.0	2.624330
Mullaney, 1883	45 11 27.300	842.8	325 07 31.3	145 07 53.6	Alder Point	1201.9	3.079874
	123 57 10.115	220.8	342 35 13.3	162 35 26.5	Spruce	1363.8	3.134751
			359 21 12.5	179 21 12.8	Red Rock	1031.6	3.013493
Sand Dune, 1883	45 11 14.913	460.4	246 11 06.6	66 11 34.7	Mullaney	947.1	2.976414
	123 57 49.809	1087.4	306 27 52.7	126 28 21.1	Red Rock	1092.1	3.038254
Buckhorn, 1883	45 11 03.478	107.4	222 16 11.9	42 16 22.3	Sand Dune	477.0	2.678543
	123 58 04.506	98.4	283 51 57.6	103 52 36.5	Red Rock	1235.2	3.091725
			5 00 32.1	185 00 30.1	Beach	671.2	2.826881
Barnhart, 1883	45 10 54.925	1695.6	122 54 59.2	302 54 28.2	Sand Dune	1135.6	3.055243
	123 57 06.140	134.0	175 02 14.9	355 02 12.1	Mullaney	1003.2	3.001386
			268 43 28.1	88 43 47.5	Alder Point	600.6	2.778577
			313 12 42.4	133 12 52.7	Spruce	440.9	2.644323
Horseshoe Dune, 1883	45 11 32.471	1002.4	283 25 00.2	103 25 21.9	Mullaney	687.9	2.837506
	123 57 40.766	889.9	326 53 06.0	146 53 30.6	Barnhart	1383.8	3.141072
			330 14 50.0	150 15 12.0	Red Rock	1372.0	3.137340
			20 00 44.3	200 00 37.9	Sand Dune	576.9	2.761068

Nestugga Bay—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Hardy Rock, 1883	45 11 24.944	770.0	243 04 40.6	63 04 55.5	Horseshoe Dune	513.2	2.710313
	123 58 01.729	37.8	319 57 21.0	139 57 29.5	Sand Dune	404.5	2.606903
			5 13 40.4	185 13 38.4	Buckhorn	665.4	2.823093
Nestugga Bay southeast base, 1883	45 11 47.627	1470.3	324 29 05.5	144 29 20.0	Mullaney	770.9	2.887000
	123 57 30.630	668.6	25 18 37.5	205 18 30.3	Horseshoe Dune	517.5	2.713941
Drift, 1883	45 11 46.288	1429.0	266 13 37.1	86 13 57.5	Nestugga Bay southeast base	628.6	2.798405
	123 57 59.368	1295.9	316 24 22.8	136 24 36.0	Horseshoe Dune	588.9	2.770042
			4 28 22.2	184 28 20.5	Hardy Rock	660.9	2.820134
Nestugga Bay northwest base, 1883	45 12 05.779	178.4	328 39 55.5	148 40 06.6	Nestugga Bay southeast base	656.0	2.816920
	123 57 46.259	1009.6	353 20 51.1	173 20 55.0	Horseshoe Dune	1035.2	3.015015
			25 26 00.4	205 25 51.1	Drift	666.2	2.823637

Yaquina Bay and River.

Principal points.							
Jet, 1914	44 36 59.380	1832.9	173 00 00.2	352 59 56.7	Yaquina Head Lighthouse, old tower.	910.0	2.959026
	124 03 38.692	853.1					
Port, 1914	44 37 46.219	1426.7	14 32 09.1	194 31 57.2	Jet	1498.6	3.174239
	124 03 21.689	478.1	41 49 59.5	221 49 44.1	Yaquina Head Lighthouse, old tower.	728.3	2.862284
Wire, 1914	44 37 10.047	310.1	68 10 01.6	248 09 35.4	Jet	885.2	2.947031
	124 03 01.424	31.4	121 36 54.4	301 36 24.7	Yaquina Head Lighthouse, old tower.	1095.0	3.039405
			158 11 42.5	338 11 28.2	Port	1202.6	3.080130
Mack, 1914	44 37 38.354	1183.9	59 22 39.6	239 21 52.6	Wire	1715.1	3.234282
	124 01 54.481	1201.0	97 12 23.1	277 11 21.8	Port	1937.7	3.287276
Yaquina east base, 1914	44 37 12.842	396.4	136 10 00.5	316 09 29.0	Port	1428.3	3.154827
	124 02 36.813	811.6	229 50 16.0	49 50 45.7	Mack	1221.1	3.086746
Yaquina west base, 1914	44 37 13.591	419.5	158 50 43.2	338 50 30.8	Port	1080.0	3.033404
	124 03 04.008	88.4	243 29 16.8	63 30 05.6	Mack	1712.8	3.233702
			272 12 13.2	92 12 32.3	Yaquina east base	600.001	2.778152
Hint, 1914	44 36 52.370	1616.5	105 31 27.2	285 30 24.6	Wire	2039.7	3.309575
	124 01 32.282	711.8	124 34 57.9	304 33 41.0	Port	2929.3	3.466760
			160 58 39.9	340 58 24.3	Mack	1501.4	3.176503
Bend, 1914	44 37 22.652	699.2	61 43 05.4	241 42 10.1	Hint	1972.3	3.294973
	124 00 13.509	297.8	102 17 38.8	282 16 27.9	Mack	2278.1	3.357571
Quill, 1914	44 36 41.359	1276.6	105 34 52.9	285 34 14.1	Hint	1265.7	3.102346
	124 00 36.985	815.5	135 50 44.2	315 49 49.8	Mack	2452.4	3.389592
			202 05 58.4	22 06 14.9	Bend	1375.7	3.138520
Made, 1914	44 36 24.105	744.1	123 57 36.9	303 56 55.7	Hint	1562.1	3.193700
	124 00 33.521	739.2	171 50 14.4	351 50 12.0	Quill	538.1	2.730822
Case, 1914	44 36 22.145	683.6	146 32 28.3	326 32 08.7	Hint	1118.3	3.048563
	124 01 04.318	95.2	225 27 31.7	45 27 50.9	Quill	845.6	2.927160
			264 54 25.9	84 54 47.5	Made	681.8	2.833678
Yaq, 1914	44 36 10.802	333.4	117 20 52.5	297 20 31.0	Case	762.2	2.882081
	124 00 33.617	741.4	180 17 43.7	0 17 43.8	Made	410.6	2.613439
Soft, 1914	44 36 05.288	163.2	157 47 13.1	337 47 06.4	Case	562.0	2.749765
	124 00 54.683	1206.0	218 46 47.9	38 47 02.8	Made	745.1	2.872200
			249 52 40.0	69 52 54.8	Yaq	494.8	2.694409
Out, 1914	44 35 51.065	1576.2	185 55 03.2	5 55 04.6	Soft	441.4	2.644835
	124 00 56.746	1251.6	219 56 10.3	39 56 26.5	Yaq	794.6	2.900150
Wise, 1914	44 35 44.008	1358.4	121 19 05.4	301 18 54.0	Out	419.1	2.622286
	124 00 40.514	893.6	154 33 34.3	334 33 24.3	Soft	727.4	2.861780
			190 25 15.3	10 25 20.1	Yaq	840.9	2.924765
Log, 1914	44 35 36.802	1136.0	210 49 35.2	30 49 43.6	Out	512.7	2.709871
	124 01 08.659	191.0	250 16 56.1	70 17 15.9	Wise	659.4	2.819166
Et, 1914	44 35 24.093	743.7	149 57 07.1	329 56 59.9	Log	453.2	2.656306
	124 00 58.370	1287.5	182 27 46.3	2 27 47.5	Out	833.3	2.920824
			212 38 39.8	32 38 52.4	Wise	730.1	2.863381
Stump, 1914	44 35 10.146	313.2	203 52 20.9	23 52 32.5	Log	899.8	2.954147
	124 01 26.169	555.2	233 55 58.4	53 56 17.2	Et	731.3	2.864092
Water, 1914	44 35 10.103	311.9	90 10 51.7	270 10 38.3	Stump	422.9	2.626203
	124 01 06.000	132.4	175 55 43.5	355 55 41.7	Log	826.2	2.917095
			201 17 28.3	21 17 33.7	Et	463.5	2.666018

Yaquina Bay and River—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Mud, 1914	44 34 51.468	1588.7	155 34 40.6	335 34 32.3	Stump	633.2	2.801544
	124 01 13.301	293.4	195 38 32.2	15 38 37.3	Water	597.4	2.776226
Road, 1914	44 35 04.863	150.1	36 18 01.8	216 17 52.1	Mud	513.0	2.710136
	124 00 59.534	1313.3	106 05 20.8	296 05 02.8	Stump	588.6	2.769790
			138 35 46.3	318 35 41.7	Water	215.7	2.333769
Caf, 1914	44 34 46.812	445.0	111 08 36.9	291 08 25.1	Mud	398.5	2.600388
	124 00 56.456	1245.7	173 03 01.7	353 02 59.6	Road	561.3	2.749199
Rail, 1914	44 35 02.915	90.0	6 16 24.6	186 16 22.9	Caf	500.1	2.699028
	124 00 53.979	1190.8	50 20 41.8	230 20 28.3	Mud	553.7	2.743262
			116 07 35.0	296 07 31.2	Road	136.5	2.135139
Can, 1914	44 35 00.617	19.0	66 41 25.5	246 40 54.1	Caf	1076.7	3.032100
	124 00 11.635	256.7	94 20 49.7	274 20 20.0	Rail	936.8	2.971652
King, 1914	44 34 43.071	1329.5	96 24 11.0	276 23 38.3	Caf	1036.2	3.015425
	124 00 09.783	215.8	122 08 34.6	302 08 03.6	Rail	1151.5	3.061251
			175 41 09.3	355 41 08.0	Can	543.1	2.734913
Gravel, 1914	44 34 38.197	1179.0	112 24 34.1	292 24 22.5	King	394.7	2.596264
	123 59 53.244	1174.7	149 37 10.8	329 36 57.9	Can	802.2	2.904298
Slope, 1914	44 34 54.474	1681.5	21 08 46.5	201 08 40.3	Gravel	538.7	2.731371
	123 59 44.435	980.3	57 48 51.0	237 48 33.2	King	660.8	2.820055
			107 32 17.3	287 31 58.2	Can	629.3	2.798854
Low, 1914	44 34 46.084	1422.5	67 41 21.5	247 41 02.6	Gravel	641.3	2.807054
	123 59 26.353	581.4	122 59 37.3	302 59 24.6	Slope	475.6	2.677246
Shell, 1914	44 34 31.393	969.0	121 14 50.7	301 14 39.7	Gravel	404.8	2.607255
	123 59 37.557	828.7	167 58 37.7	347 58 32.9	Slope	728.4	2.862390
			208 35 41.1	28 35 49.0	Low	516.5	2.713036
Pile, 1914	44 34 18.272	564.0	112 56 37.8	292 56 07.3	Shell	1039.2	3.016680
	123 58 54.185	1195.6	140 25 16.6	320 24 54.0	Low	1113.9	3.046837
Pine, 1914	44 34 34.149	1054.1	83 44 43.5	263 44 18.8	Shell	780.5	2.892348
	123 59 02.395	52.8	124 52 33.7	304 52 16.9	Low	644.3	2.809083
			339 42 53.6	159 42 59.4	Pile	522.5	2.718086
Cut, 1914	44 34 31.993	987.5	36 10 11.5	216 10 01.7	Pile	524.6	2.719857
	123 58 40.153	885.9	97 43 37.0	277 43 21.4	Pine	495.2	2.694812
Clay, 1914	44 34 17.817	550.0	91 49 12.6	271 48 58.6	Pile	442.7	2.646071
	123 58 34.134	753.2	128 57 28.3	308 57 08.5	Pine	801.9	2.904101
			163 07 03.1	343 06 58.9	Cut	457.3	2.660186
Shelf, 1914	44 34 17.374	536.3	91 12 40.3	271 12 19.7	Clay	647.5	2.811220
	123 58 04.797	105.8	120 02 57.4	300 02 32.6	Cut	901.2	2.954825
Boone, 1914	44 34 31.422	969.9	45 43 27.4	225 43 13.7	Clay	601.6	2.779277
	123 58 14.614	322.4	91 47 31.6	271 47 13.7	Cut	563.8	2.751090
			333 27 18.8	153 27 25.7	Shelf	484.7	2.685486
Slue, 1914	44 34 35.460	1094.6	15 53 09.8	195 53 04.7	Shelf	580.4	2.763749
	123 57 57.596	1270.8	71 38 14.4	251 38 02.4	Boone	395.6	2.597272
Wharf, 1914	44 34 30.696	947.5	54 52 14.4	234 51 55.8	Shelf	714.6	2.854044
	123 57 38.311	845.3	91 36 23.6	271 35 58.1	Boone	801.3	2.903791
			109 04 02.8	289 03 49.3	Slue	450.2	2.653404
Slip, 1914	44 34 48.034	1482.7	18 04 00.3	198 03 54.7	Wharf	562.9	2.750466
	123 57 30.398	670.6	57 06 24.3	237 06 05.2	Slue	714.7	2.854091
Hill, 1914	44 34 50.357	1554.4	2 55 19.1	182 55 18.3	Slue	460.4	2.663159
	123 57 56.532	1247.2	277 05 07.4	97 05 25.7	Slip	581.0	2.764183
			326 28 35.7	146 28 48.4	Wharf	728.0	2.862108
Red, 1914	44 35 08.306	256.4	32 23 19.8	212 23 08.6	Hill	656.1	2.816984
	123 57 40.601	895.6	340 12 50.7	160 12 57.8	Slip	665.0	2.822826
Spit, 1914	44 35 03.692	114.0	2 34 58.4	182 34 57.7	Slip	483.8	2.684678
	123 57 29.410	648.8	55 28 37.0	235 28 18.0	Hill	726.3	2.861096
			119 58 53.1	299 58 45.3	Red	285.0	2.454889
Near, 1914	44 35 06.161	190.2	59 33 12.9	239 33 08.8	Spit	150.4	2.177220
	123 57 23.533	519.1	99 58 33.9	279 58 22.0	Red	382.3	2.582425
Mill, 1914	44 35 12.774	394.3	54 08 18.2	234 08 12.2	Red	235.4	2.371839
	123 57 31.953	704.9	317 42 00.0	137 42 05.9	Near	276.0	2.440903
			348 41 03.2	168 41 05.0	Spit	285.9	2.456221
Dead, 1914	44 35 22.789	703.4	43 53 26.3	223 53 10.6	Near	712.2	2.852598
	123 57 01.151	25.4	65 32 20.6	245 31 59.0	Mill	746.5	2.873019
Alder, 1914	44 35 09.653	298.0	79 08 18.0	259 08 00.1	Near	572.0	2.757363
	123 56 58.070	1281.0	97 20 50.8	277 20 27.0	Mill	753.6	2.877155
			170 29 10.3	350 29 08.1	Dead	411.1	2.613972
Soap, 1914	44 35 17.106	528.0	66 06 16.1	246 05 59.6	Alder	567.8	2.754206
	123 56 34.537	761.8	106 38 27.8	286 38 09.1	Dead	612.7	2.787267

Yaquina Bay and River—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Grass, 1914	44 35 28.336	874.7	37 43 10.3	217 42 56.1	Alder	729.0	2.862735
	123 56 37.852	834.9	71 34 39.2	251 34 22.8	Dead	541.7	2.733753
			348 05 12.5	168 05 14.8	Soap	354.3	2.549347
Apple, 1914	44 35 37.876	1169.1	15 22 35.1	195 22 29.5	Soap	664.9	2.822773
	123 56 26.544	585.5	40 15 58.1	220 15 50.2	Grass	385.9	2.586492
Dark, 1914	44 35 33.762	1042.1	46 25 44.2	226 25 27.0	Soap	745.9	2.872676
	123 56 10.038	221.4	74 44 01.0	254 43 41.5	Grass	636.0	2.803427
			109 13 53.9	289 13 42.3	Apple	385.6	2.586118
Field, 1914	44 35 51.717	1596.4	0 04 21.2	180 04 21.2	Dark	554.2	2.743695
	123 56 10.006	220.7	40 29 26.7	220 29 15.1	Apple	561.8	2.749556
Dune, 1914	44 35 48.633	1501.2	4 04 23.5	184 04 22.7	Apple	332.9	2.522299
	123 56 25.472	561.8	254 24 19.9	74 24 30.7	Field	354.1	2.549172
			323 26 19.7	143 26 30.5	Dark	571.5	2.757011
Hump, 1914	44 36 12.664	390.9	314 32 01.7	134 32 22.6	Field	921.9	2.964677
	123 56 39.802	877.7	336 55 18.0	156 55 28.1	Dune	806.3	2.906492
Dike, 1914	44 36 16.779	517.9	62 13 54.4	242 13 46.7	Hump	272.6	2.435596
	123 56 28.863	636.5	331 44 15.3	151 44 28.5	Field	878.3	2.943642
			355 04 49.0	175 04 51.4	Dune	872.0	2.940522
Flat, 1914	44 36 37.344	1152.7	332 31 54.9	152 32 05.4	Dike	715.4	2.854562
	123 56 43.827	966.4	353 21 17.8	173 21 20.6	Hump	767.0	2.884772
High, 1914	44 36 35.918	1108.7	260 21 27.8	80 21 36.1	Flat	262.8	2.419614
	123 56 55.576	1225.5	315 04 47.2	135 05 06.0	Dike	834.3	2.921307
			334 08 37.2	154 08 48.3	Hump	797.6	2.901505
Saw, 1914	44 36 59.092	1824.0	5 30 56.6	185 30 54.3	High	718.6	2.856512
	123 56 52.444	1156.3	344 11 46.4	164 11 52.4	Flat	697.7	2.843650
Launch, 1914	44 36 51.500	1589.7	23 19 35.2	203 19 29.2	Flat	475.8	2.677471
	123 56 35.282	777.9	42 56 12.1	222 55 57.8	High	657.0	2.817531
			121 46 18.0	301 46 06.0	Saw	445.1	2.648442
City, 1914	44 37 07.483	231.0	47 06 59.8	227 06 42.9	Launch	724.9	2.860299
	123 56 11.191	246.7	74 06 32.3	254 06 03.4	Saw	945.7	2.975753
Last, 1914	44 37 17.287	533.6	34 21 36.0	214 21 23.8	Saw	690.3	2.839714
	123 56 35.029	772.3	299 55 51.7	119 56 08.4	City	606.5	2.7828[illegible]0
			0 24 05.2	180 24 05.0	Launch	796.0	2.900904
Supplementary points.							
Sea, 1914	44 35 58.627	1809.7	184 12 08.5	4 12 15.0	Yaquina Head Lighthouse, old tower.	2786.0	3.444978
	124 03 52.983	1168.5					
			189 32 16.4	9 32 26.4	Jet	1901.6	3.279120
			191 44 01.4	11 44 23.3	Port	3392.1	3.530462
Yaquina Jetty light, 1914	44 36 55.552	1714.7	189 20 12.3	9 20 17.7	Yaquina Head Lighthouse, old tower.	1035.1	3.014966
	124 03 51.339	1131.9					
			247 02 06.3	67 02 15.2	Jet	302.9	2.481248
			247 52 16.6	67 52 51.7	Wire	1188.0	3.074817
Wet,[1] 1914	44 37 09.24	285.2	263 12 50	83 13 26	Yaquina west base	1138.6	3.056351
	124 03 55.29	1299.0	309 44 13	129 44 25	Jet	475.9	2.677493
Round,[1] 1914	44 37 02.91	89.8	158 12 28	338 12 18	Yaquina Head Lighthouse, old tower.	855.4	2.932170
	124 03 29.32	646.4					
			187 10 07	7 10 13	Port	1347.4	3.129507
Pavilion, 1914	44 37 11.350	350.3	62 07 07.8	242 06 45.5	Jet	790.0	2.897619
	124 03 07.021	154.8	123 24 49.3	303 24 23.5	Yaquina Head Lighthouse, old tower.	969.3	2.986452
			163 16 47.9	343 16 37.5	Port	1123.9	3.050719
Mast, 1914	44 37 27.217	840.1	289 43 51.7	109 44 31.1	Yaquina east base	1314.0	3.118580
	124 03 32.912	725.6	303 25 29.6	123 25 49.9	Yaquina west base	763.5	2.882826
			8 26 03.8	188 25 59.8	Jet	868.7	2.938853
Boathouse, east gable, 1914	44 37 31.140	961.2	298 56 28.8	118 57 01.3	Yaquina east base	1167.0	3.067056
	124 03 23.134	510.0	322 06 04.1	142 06 17.5	Yaquina west base	686.5	2.836610
			19 17 03.9	199 16 53.0	Jet	1038.6	3.016454
Dry, 1914	44 37 18.608	574.4	193 42 33.9	13 42 36.3	Yaquina Head Lighthouse, old tower.	318.8	2.503446
	124 03 47.149	1039.4					
			279 15 20.7	99 14 50.9	Yaquina west base	963.7	2.983950
			342 33 32.1	162 33 38.0	Jet	622.1	2.793873
Old hotel, northeast corner, 1914	44 37 35.745	1103.4	267 36 45.9	87 37 47.7	Mack	1941.0	3.288023
	124 03 22.456	495.0	298 51 11.3	118 52 28.7	Hint	2773.5	3.443029
			329 41 29.2	149 41 44.0	Wire	918.8	2.963216
Nye,[1] 1914	44 38 01.53	47.2	321 28 46	141 28 58	Port	604.2	2.781186
	124 03 38.76	854.3	6 08 57	186 08 53	Yaquina Head Lighthouse, old tower.	1021.2	3.009129
Bridge, 1914	44 37 55.902	1725.5	4 52 21.4	184 52 17.6	Wire	1420.6	3.152468
	124 02 55.950	1233.3	7 44 44.1	187 44 38.4	Yaquina west base	1318.1	3.119940
			342 23 19.6	162 23 33.0	Yaquina east base	1394.5	3.144419

[1] No check on this position.

Yaquina Bay and River—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Middle Ground light, 1914	44 37 49.710	1534.4	7 03 52.6	187 03 47.9	Wire	1233.7	3.091204
	124 02 54.542	1202.3	10 36 09.9	190 36 03.3	Yaquina west base	1134.3	3.054720
			341 02 41.4	161 02 53.9	Yaquina east base	1203.3	3.080357
House, large green, cupola, 1914	44 37 59.030	1822.1	8 22 23.5	188 22 16.4	Wire	1528.3	3.184200
	124 02 51.330	1131.4	29 33 38.2	209 33 04.9	Jet	2116.6	3.325644
			347 20 52.8	167 21 02.9	Yaquina east base	1461.2	3.164694
Yaquina Bar front range light, 1914	44 37 27.031	834.4	53 19 20.6	233 19 02.9	Yaquina west base	694.5	2.841687
	124 02 38.741	854.1	122 02 07.5	302 01 37.4	Port	1116.7	3.047945
			354 27 07.7	174 27 09.1	Yaquina east base	440.0	2.643483
Yaquina Bar rear range light, 1914	44 37 39.468	1218.3	42 40 41.9	222 40 17.7	Yaquina east base	1117.9	3.048388
	124 02 02.442	53.8	55 04 26.2	235 03 44.8	Wire	1586.0	3.200314
			335 25 08.1	155 25 29.3	Hint	1598.6	3.203752
Phone, 1914	44 37 21.006	648.4	65 07 15.3	245 06 58.0	Yaquina east base	598.9	2.777331
	124 02 12.170	268.3	78 40 49.4	258 40 13.0	Yaquina west base	1165.5	3.066518
			216 03 40.8	36 03 53.2	Mack	662.5	2.821155
Back, 1914	44 36 43.288	1336.2	145 25 56.0	325 25 13.4	Port	2359.2	3.372758
	124 02 20.965	462.2	159 02 36.2	339 02 25.1	Yaquina east base	976.9	2.989851
			198 57 21.9	18 57 40.5	Mack	1797.2	3.254606
Beacon 8, 1914	44 37 06.274	193.7	99 24 41.1	279 24 02.1	Yaquina east base	1240.6	3.093648
	124 01 41.297	910.5	163 38 38.2	343 38 28.9	Mack	1032.0	3.013683
			255 21 09.8	75 22 11.5	Bend	2000.4	3.301113
Beacon 10, 1914	44 36 48.800	1506.3	101 37 44.9	281 37 27.9	Hint	546.7	2.737762
	124 01 07.995	176.3	288 33 55.1	108 34 16.9	Quill	721.3	2.858119
			354 22 18.0	174 22 20.6	Case	826.8	2.917380
Old Rock, 1914	44 36 42.525	1312.6	36 33 08.8	216 32 54.0	Case	783.1	2.893796
	124 00 43.170	951.9	105 40 51.6	285 40 17.2	Hint	1124.7	3.051044
			339 28 53.2	159 29 00.0	Made	607.1	2.783245
Coquille Point light, 1914	44 36 39.268	1212.1	42 55 59.8	222 55 44.2	Case	721.9	2.858454
	124 00 42.021	926.6	110 03 13.5	290 02 38.3	Hint	1179.7	3.071777
			338 10 24.0	158 10 30.0	Made	504.2	2.702584
Beacon 12, 1914	44 36 35.056	1062.1	28 12 51.5	208 12 44.7	Case	452.3	2.655396
	124 00 54.622	1204.4	122 46 05.5	302 45 39.1	Hint	987.5	2.994536
			305 59 45.7	126 00 00.5	Made	575.1	2.759776
Far,[1] 1914	44 36 31.72	979.1	234 30 12	54 31 22	Bend	2708.1	3.432660
	124 01 53.52	1180.2	259 59 43	80 00 36	Quill	1713.6	3.233911
Full, 1914	44 37 46.958	1449.5	13 43 53.4	193 43 40.3	Hint	1734.5	3.239185
	124 01 13.609	300.0	299 30 59.4	119 31 41.6	Bend	1522.5	3.182569
			338 15 24.4	158 15 50.1	Quill	2179.9	3.338435
Church, flagstaff, 1914	44 36 31.204	963.2	6 06 02.3	186 06 00.1	Yaq	633.3	2.801640
	124 00 30.565	674.0	33 37 15.7	213 36 58.7	Soft	960.6	2.982556
			69 24 45.1	249 24 21.4	Case	795.1	2.900430
Shade, 1914	44 35 21.740	671.1	216 23 40.0	36 23 50.9	Log	577.6	2.761623
	124 01 24.196	533.7	262 43 57.5	82 44 15.6	Et	574.3	2.759136
			345 34 24.9	165 34 32.5	Mud	964.9	2.984459
Old wharf, 1914	44 35 01.569	48.4	63 17 58.4	243 17 29.6	Caf	1013.6	3.005874
	124 00 15.411	340.0	325 51 57.1	145 52 12.6	Gravel	871.6	2.940300
			347 43 54.3	167 43 58.2	King	584.3	2.766653
Schoolhouse, chimney,[1] 1914	44 34 40.88	1261.9	185 00 48	5 00 50	Can	611.5	2.786398
	124 00 14.06	310.2	237 17 48	57 18 09	Slope	776.6	2.890202
Hill (U. S. E.),[1] 1914	44 34 34.47	1064.0	310 39 08	130 39 08	Pine	15.1	1.17840
	123 59 02.91	64.2					
Old House, 1914	44 34 15.118	466.7	121 28 20.7	301 27 54.6	Shell	962.4	2.983356
	123 59 00.354	7.8	141 19 29.7	321 18 58.8	Slope	1556.2	3.192061
			149 02 02.8	329 01 44.6	Low	1114.8	3.047188
Front Range 1, 1914	44 34 17.318	534.6	125 20 06.2	305 19 42.9	Pine	898.4	2.953458
	123 58 29.178	643.8	151 52 22.0	331 52 14.3	Cut	513.6	2.710656
			216 25 46.9	36 25 57.1	Boone	541.1	2.733291
Rear Range 1, 1914	44 34 16.745	516.9	124 56 39.4	304 56 15.0	Pine	938.0	2.972199
	123 58 27.546	607.8	149 25 05.1	329 24 56.3	Cut	546.7	2.737750
			212 12 10.8	32 12 19.9	Boone	535.4	2.728602
Front Range 2, 1914	44 34 59.500	1839.4	21 20 27.0	201 20 23.5	Hill	306.0	2.485691
	123 57 51.485	1135.8	226 37 56.8	46 38 10.5	Mill	592.7	2.772834
			255 25 20.0	75 25 35.5	Spit	503.2	2.701730
Rear Range 2, 1914	44 34 56.903	1756.4	231 17 21.7	51 17 35.7	Red	562.9	2.750401
	123 58 00.511	11.3	250 41 26.5	70 41 52.4	Near	864.4	2.936703
			253 00 46.1	73 01 07.9	Spit	717.4	2.855768
Rock (U. S. E.),[1] 1914	44 35 06.91	213.3	221 25 58	41 25 59	Red	57.3	1.75838
	123 57 42.32	933.6					

[1] No check on this position.

Yaquina Bay and River—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Mill 4 (U. S. E.),[1] 1914	44 35 10.87 123 57 35.46	{35.5 782.2	232 48 26	52 48 28	Mill	97.1	1.98713
Front Range 3, 1914	44 35 36.759 123 56 10.739	1134.7 236.9	350 30 17.9 95 39 11.7 138 26 39.8	170 30 18.4 275 39 00.6 318 26 29.5	Dark Apple Dune	93.8 350.3 489.8	1.972127 2.544440 2.690054
Rear Range 3, 1914	44 35 42.803 123 56 04.833	1321.2 106.6	58 29 19.8 72 22 59.9 111 34 24.1	238 28 56.6 252 22 44.6 291 34 09.6	Grass Apple Dune	854.3 502.4 489.5	2.931614 2.701083 2.689750
Front Range 5, 1914	44 35 38.200 123 56 06.411	1179.1 141.4	30 16 55.8 88 42 42.4 127 27 19.0	210 16 53.2 268 42 28.2 307 27 05.6	Dark Apple Dune	158.6 444.2 529.6	2.200424 2.647555 2.723932
Rear Range 5,[1] 1914	44 35 35.88 123 56 04.39	1107.5 96.8	130 15 00 165 47 15	310 14 45 345 47 11	Dune Field	609.1 504.2	2.784694 2.702575
Hanson (U. S. E.),[1] 1914	44 35 38.84 123 56 26.82	1198.8 591.6	348 33 36	168 33 36	Apple	30.2	1.47986
Front Range 4, 1914	44 35 43.012 123 56 10.750	1327.7 237.1	356 51 14.6 118 07 10.3 183 29 28.8	176 51 15.1 298 07 00.0 3 29 29.3	Dark Dune Field	296.0 368.2 269.2	2.456306 2.566046 2.430085
Rear Range 4, 1914	44 35 49.005 123 56 08.465	1512.7 186.7	4 13 00.9 88 14 52.5 157 54 04.1	184 12 59.8 268 14 40.6 337 54 03.0	Dark Dune Field	471.8 375.3 90.4	2.673763 2.574343 1.955906
Front Range 6, 1914	44 35 56.291 123 56 15.214	1737.6 335.5	43 44 56.5 132 59 12.8 154 32 54.4	223 44 49.3 312 58 55.4 334 32 44.8	Dune Hump Dike	327.2 741.3 700.4	2.514814 2.869984 2.845357
Rear Range 6, 1914	44 36 04.267 123 56 16.512	131.7 364.2	22 16 10.5 116 46 44.4 144 48 30.1	202 16 04.2 296 46 27.9 324 48 21.4	Dune Hump Dike	521.5 575.3 472.6	2.717232 2.759910 2.674496
Barn (U. S. E.),[1] 1914	44 36 10.055 123 56 38.242	310.4 843.4	156 52 13	336 52 12	Hump	87.6	1.94241
Front Range 7, 1914	44 36 32.183 123 56 53.442	993.4 1178.5	233 04 58.6 311 15 24.8 333 28 10.6	53 05 05.4 131 15 42.1 153 28 20.2	Flat Dike Hump	265.2 721.0 673.4	2.423564 2.857949 2.828290
Rear Range 7, 1914	44 36 33.734 123 56 54.794	1041.3 1208.2	245 15 33.4 312 27 46.6 333 03 13.4	65 15 41.1 132 28 04.8 153 03 23.9	Flat Dike Hump	266.3 775.2 729.6	2.425324 2.889390 2.863068
Front Range 8, 1914	44 36 48.301 123 56 57.305	1490.9 1263.5	258 30 09.4 318 41 33.2 340 39 52.2	78 30 24.9 138 41 42.7 160 40 04.5	Launch Flat Hump	495.5 450.2 1165.8	2.695067 2.653431 3.066608
Rear Range 8, 1914	44 36 49.474 123 56 57.847	1527.1 1275.5	262 49 59.5 320 27 11.5 340 41 52.6	82 50 15.3 140 27 21.3 160 42 05.2	Launch Flat Hump	501.5 485.6 1203.9	2.700237 2.686234 3.080585
Lower Dike Light, 1914	44 35 52.521 123 56 21.371	1621.2 471.3	37 00 09.7 275 39 04.1 336 38 56.6	217 00 06.9 95 39 12.1 156 39 04.6	Dune Field Dark	150.3 251.9 630.7	2.176852 2.401211 2.799822
Toledo Beacon 10, 1914	44 36 53.328 123 56 51.569	1646.1 1137.0	9 20 14.9 278 55 33.4 340 54 46.5	189 20 12.0 98 55 44.8 160 54 51.9	High Launch Flat	544.6 363.5 522.1	2.736077 2.560530 2.717731
Toledo Beacon 12, 1914	44 36 58.111 123 56 42.649	1793.7 940.3	22 35 34.6 321 28 38.1 2 19 10.7	202 35 25.5 141 28 43.3 182 19 09.9	High Launch Flat	742.0 260.8 641.5	2.870382 2.416342 2.807225
Stream, 1914	44 36 47.064 123 56 09.334	1452.7 205.8	103 27 51.6 111 20 27.3 148 44 02.8	283 27 33.3 291 19 57.0 328 43 44.7	Launch Saw Last	588.3 1020.5 1091.5	2.769594 3.008798 3.038006
Day Beacon, 1914	44 36 57.606 123 56 33.446	1778.1 737.4	96 15 17.7 176 42 41.7 238 08 28.8	276 15 04.4 356 42 40.6 58 08 44.4	Saw Last City	421.4 608.5 577.7	2.624677 2.784275 2.761696
Hog, 1914	44 36 58.546 123 56 20.945	1807.1 461.8	55 28 36.2 151 46 34.4 217 56 09.8	235 28 26.1 331 46 24.5 37 56 16.6	Launch Last City	383.7 656.6 349.8	2.583978 2.817262 2.543834
Front Range 9, 1914	44 37 03.041 123 56 42.423	93.9 935.3	61 06 49.3 200 20 22.2 336 09 24.7	241 06 42.3 20 20 27.4 156 09 29.7	Saw Last Launch	252.4 469.0 389.5	2.402000 2.671132 2.590492
Rear Range 9, 1914	44 37 03.868 123 56 41.557	119.4 916.2	58 26 38.7 199 09 34.8 340 04 45.6	238 26 31.1 19 09 39.4 160 04 50.0	Saw Last Launch	281.7 438.5 406.1	2.449781 2.641955 2.608591
Depot Slough light, 1914	44 36 55.866 123 56 20.018	1724.4 441.4	68 10 48.7 153 24 45.0 208 29 25.7	248 10 38.0 333 24 34.5 28 29 31.9	Launch Last City	362.5 739.4 408.0	2.559335 2.868884 2.610666

[1] No check on this position.

Yaquina Bay and River—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Front Range 11, 1914	44 36 55.482	1712.6	74 46 11.3	254 45 56.9	Launch	467.8	2.670051
	123 56 14.811	326.6	97 39 10.8	277 38 44.4	Saw	837.2	2.922823
			146 29 10.9	326 28 56.7	Last	807.3	2.907024
Rear Range 11, 1914	44 36 54.909	1694.9	78 34 41.8	258 34 25.2	Launch	531.2	2.725292
	123 56 11.666	257.2	98 10 35.6	278 10 07.0	Saw	906.3	2.958235
			143 17 23.5	323 17 07.1	Last	861.7	2.935332
Front Range 10, 1914	44 37 02.513	77.6	5 01 19.1	185 01 18.1	Launch	341.3	2.533075
	123 56 33.927	748.0	75 29 58.2	255 29 45.2	Saw	421.7	2.624997
			252 58 57.2	72 59 13.1	City	524.2	2.719522
Rear Range 10, 1914	44 37 03.126	96.5	9 56 08.2	189 56 06.2	Launch	364.3	2.561478
	123 56 32.431	715.0	74 14 38.0	254 14 24.0	Saw	458.5	2.661314
			253 58 26.7	73 58 41.6	City	487.2	2.687732
Courthouse, flagstaff, 1914	44 37 12.863	397.0	43 32 56.6	223 32 36.6	Launch	909.8	2.958930
	123 56 06.854	151.1	67 04 51.5	247 04 19.5	Saw	1091.3	3.037955
			102 24 02.7	282 23 42.9	Last	636.0	2.803452
Schoolhouse, cupola, 1914	44 37 09.277	286.4	61 59 21.1	241 58 48.2	Launch	1168.2	3.067520
	123 55 48.506	1069.4	77 26 03.6	257 25 18.7	Saw	1444.3	3.159660
			103 33 27.1	283 32 54.4	Last	1055.1	3.023277

Heceta Head and Siuslaw River.

Principal points.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Spur, 1908	43 57 44.180	1363.6	175 06 51.9	355 06 09.1	Cape	16081.6	4.206330
	124 04 08.145	181.6	186 10 46.6	6 12 16.2	Fairview	26567.8	4.424355
			318 58 42.8	139 01 32.9	Maple	8337.7	3.921044
Cannery Hill, 1883	44 00 21.222	655.0	195 14 46.1	15 16 21.4	Cape	11584.5	4.063879
	124 07 26.701	594.8	317 35 09.3	137 37 27.2	Spur	6663.1	3.817106
Sugar Loaf 2, 1908	44 01 35.767	1103.9	200 13 36.5	20 15 18.8	Cape	9459.5	3.975869
	124 07 36.780	819.1	326 56 23.4	146 58 48.3	Spur	8526.5	3.930772
			354 25 33.1	174 25 40.1	Cannery Hill	2311.7	3.363932
Green, 1908	44 00 06.525	201.4	97 06 11.0	277 06 17.8	Cannery Hill	3659.4	3.563407
	124 04 43.714	973.9	125 33 43.7	305 31 43.4	Sugar Loaf 2	4737.9	3.675589
			177 09 07.3	357 08 49.3	Cape	11644.2	4.066108
			349 46 05.6	169 46 30.4	Spur	4464.3	3.649749
High Bald Peak, 1908	44 16 41.73	1288.0	75 47 02	255 29 15	Fairview	35057.5	4.544781
	123 36 28.88	640.2	81 26 59	261 10 54	Cummins	31009.4	4.491494
			138 36 42	318 26 48	Table	28367.4	4.452819
Cape Ridge, 1908	44 05 51.56	1591.4	21 23 12	201 21 07	Cannery Hill	10948.4	4.039352
	124 04 27.49	611.5	28 06 15	208 04 03	Sugar Loaf 2	8948.7	3.951760
			175 29 49	355 29 33	Snag	6518.9	3.814172
Snag, 1908	44 09 22.114	682.6	217 57 25.3	37 59 24.6	Fairview	6179.7	3.790966
	124 04 50.524	1122.8	4 25 32.0	184 25 18.7	Cape	5534.8	3.743102
Loaf, 1908	44 09 23.188	715.7	270 41 13.6	90 42 38.8	Snag	2717.8	3.434225
	124 06 52.822	1173.9	337 33 25.9	157 34 27.7	Cape	6006.0	3.778582
Plateau, 1908	44 11 57.592	1777.6	268 59 10.4	89 01 21.5	Fairview	4175.5	3.620704
	124 05 07.361	163.4	355 32 30.9	175 32 42.6	Snag	4813.4	3.682452
			26 11 14.2	206 10 00.7	Loaf	5310.3	3.723123
Heceta, 1908	44 08 26.001	802.5	201 23 14.7	21 23 36.4	Loaf	1895.6	3.277758
	124 07 23.931	531.9	243 03 19.1	63 05 06.0	Snag	3824.1	3.582526
Turn, 1908	44 07 57.794	1783.9	176 39 52.7	356 39 51.1	Heceta	872.1	2.940561
	124 07 21.648	481.2	232 12 58.1	52 14 43.3	Snag	4249.1	3.628302
Tree, 1908	44 08 22.366	690.3	38 30 50.9	218 30 32.0	Turn	969.2	2.986432
	124 06 54.498	1211.4	99 44 03.8	279 43 43.3	Heceta	663.8	2.822017
			181 08 12.8	1 08 14.0	Loaf	1877.6	3.273612
			236 11 37.0	56 13 03.4	Snag	3315.5	3.520546
Head, 1908	44 08 18.316	565.3	230 14 19.3	50 14 28.2	Heceta	370.9	2.569206
	124 07 36.757	817.0	332 03 55.1	152 04 05.6	Turn	717.0	2.855489
Supplementary points.							
Heceta Head Lighthouse, 1908	44 08 16.371	505.3	211 17 07.6	31 17 08.8	Head	70.2	1.846632
	124 07 38.398	853.5	227 15 06.0	47 15 16.1	Heceta	437.9	2.641366
			327 00 01.6	147 00 13.3	Turn	683.7	2.834847
Rock, southerly of two, south of lighthouse, 1908	44 08 09.157	282.6	192 19 24	12 19 26	Head	289.4	2.461453
	124 07 39.535	878.8	213 42 30	33 42 41	Heceta	625.0	2.795863
			311 24 43	131 24 56	Turn	530.2	2.724436
Keeper's house, chimney,[1] 1908	44 08 13.38	412.9	342 00 10	162 00 15	Turn	505.8	2.703943
	124 07 28.68	637.5	130 19 15	310 19 03	Head	235.5	2.372064

[1] No check on this position.

Umpqua River.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Umpqua River Lighthouse, 1908	43 39 45.935	1417.7	186 34 25.0	6 34 43.1	Cab	5117.5	3.709058
	124 11 51.518	1154.3	188 00 37.4	8 00 49.3	Beach 1908	2776.5	3.443505
			202 44 43.6	22 45 53.1	Sand Hill 2	5829.5	3.765628
Wind, 1908	43 41 49.083	1514.8	33 21 38.7	213 21 17.4	Beach, 1908	1258.6	3.099877
	124 11 03.340	74.8	158 59 29.3	338 59 14.1	Cab	1374.6	3.138163
Bench, 1908	43 41 21.728	670.6	82 54 50.5	262 53 59.2	Beach	1676.1	3.224311
	124 10 19.975	447.4	131 00 19.8	310 59 49.8	Wind	1286.8	3.109616
Brushy Hill 2, 1908	43 43 47.951	1479.9	238 01 20.0	58 04 55.6	Trail	8216.8	3.914704
	124 10 20.229	452.8	286 03 06.4	106 04 44.4	Burn	3300.4	3.518561
Cab, 1908	43 42 30.660	946.3	211 25 23.1	31 26 08.1	Brushy Hill 2	2795.6	3.446471
	124 11 25.351	567.6	252 20 30.4	72 22 53.4	Burn	4858.3	3.686482
Sand Hill 2, 1908	43 42 40.118	1238.2	80 04 53.5	260 04 02.0	Cab	1693.4	3.228771
	124 10 10.844	242.8	174 16 13.4	354 16 06.9	Brushy Hill 2	2104.0	3.323053
Beach, 1908	43 41 15.022	463.6	184 52 27.0	4 52 33.1	Cab	2342.9	3.369748
	124 11 34.242	766.9	199 20 18.3	19 21 09.4	Brushy Hill 2	5002.2	3.699165
			215 24 27.5	35 25 25.1	Sand Hill 2	3222.6	3.508202
Snipe, 1885	43 38 54.357	1677.6	337 16 54.1	157 17 29.1	Faun 2	2947.8	3.469495
	124 12 31.160	698.3	8 06 06.3	188 05 56.8	Bear	2184.9	3.339437
Deer, 1885	43 39 15.509	478.6	354 50 19.8	174 50 29.2	Faun 2	3385.7	3.529648
	124 11 53.968	1209.3	2 06 40.8	182 06 35.4	Hammock	4714.0	3.673390
			22 04 14.9	202 03 39.7	Bear	3038.5	3.482658
			51 56 05.0	231 55 39.3	Snipe	1058.7	3.024774
South Point 2, 1885	43 39 45.925	1417.3	328 37 27.3	148 37 44.9	Deer	1099.4	3.041175
	124 12 19.512	437.2	8 37 05.7	188 36 48.1	Bear	3797.5	3.579496
			9 18 53.9	189 18 45.8	Snipe	1612.8	3.207573
Beach, 1885	43 42 53.711	1657.7	319 21 14.0	139 21 56.3	Army Hill	2105.2	3.322284
	124 11 19.982	447.3	9 04 30.3	189 04 21.0	Umpqua north base	1916.4	3.282482
Sand Hill 3, 1885	43 42 39.322	1213.6	52 03 02.0	232 02 04.7	Umpqua north base	2354.7	3.371933
	124 10 10.561	236.4	105 57 14.0	285 56 26.0	Beach 1885	1616.3	3.208533
Dune, 1885	43 43 31.358	967.8	322 31 55.3	142 32 33.3	Sand Hill 3	2023.3	3.306052
	124 11 05.536	123.9	339 12 20.8	159 12 53.1	Army Hill	2951.5	3.470036
			11 34 42.1	191 34 22.8	Umpqua north base	3117.7	3.493832
			15 33 13.1	195 33 03.1	Beach 1885	1206.0	3.081356
Lake View, 1885	43 39 25.690	792.5	19 01 39.5	199 01 36.2	Deer	332.0	2.521195
	124 11 49.137	1101.1	44 15 14.3	224 14 45.4	Snipe	1349.6	3.130199
			132 33 16.4	312 32 55.5	South Point 2	923.9	2.965632
Stage Landing, 1885	43 40 11.138	343.7	4 53 30.7	184 53 27.0	Lake View	1408.1	3.148626
	124 11 43.778	980.8	45 49 06.2	225 48 41.6	South Point 2	1116.5	3.047843
Umpqua south base, 1885	43 41 13.775	425.1	6 02 27.4	186 02 16.5	Lake View	3354.7	3.525652
	124 11 33.381	747.6	6 52 13.6	186 52 06.4	Stage Landing	1947.1	3.289388
			20 52 06.9	200 51 35.1	South Point 2	2901.5	3.462627
Umpqua north base, 1885	43 41 52.394	1617.0	359 53 35.1	179 53 35.2	Umpqua south base	1191.9	3.076229
	124 11 33.480	749.7	4 13 19.5	184 13 12.4	Stage Landing	3133.5	3.496029
			14 48 07.0	194 47 35.3	South Point 2	4037.0	3.606062
Army Hill, 1885	43 42 01.952	60.2	29 07 17.8	209 06 19.1	Stage Landing	3914.5	3.592681
	124 10 18.742	419.7	48 21 10.1	228 20 18.6	Umpqua south base	2237.1	3.349683
			80 00 39.4	259 59 47.8	Umpqua north base	1699.4	3.230284
Brushy Hill, 1885	43 43 47.742	1473.5	354 08 32.9	174 08 39.6	Sand Hill 3	2122.7	3.326888
	124 10 20.288	453.0	359 24 45.0	179 24 46.0	Army Hill	3265.1	3.513898
			38 44 03.2	218 43 21.9	Beach 1885	2137.5	3.329911
			63 29 49.5	243 29 18.2	Dune	1133.0	3.054217
Carson Tree, 1885	43 44 53.361	1646.9	359 43 35.9	179 43 36.5	Sand Hill 3	4136.8	3.616689
	124 10 11.443	256.0	1 46 11.1	181 46 06.0	Army Hill	5292.6	3.723673
			18 12 28.3	198 11 31.6	Umpqua north base	5879.2	3.769320
			22 33 51.4	202 33 04.0	Beach 1885	3998.6	3.601911
Diercks, 1885	43 45 02.976	91.8	295 15 39.9	115 15 59.3	Carson Tree	695.3	2.842177
	124 10 39.548	884.8	12 47 01.9	192 46 33.9	Beach 1885	4090.8	3.611808
Wreck Tacoma, 1885	43 45 01.959	60.5	267 34 34.5	87 32 57.5	Diercks	743.4	2.871247
	124 11 12.747	285.2	356 41 48.0	176 41 53.0	Dune	2800.8	3.447289
			2 20 35.6	182 20 30.7	Beach 1885	3961.4	3.597845
Schroader, 1885	43 46 04.538	140.1	348 30 14.7	168 30 28.5	Carson Tree	2241.7	3.350574
	124 10 31.411	702.6	5 28 23.1	185 28 17.5	Diercks	1908.7	3.280733
			25 35 16.3	205 34 47.6	Wreck Tacoma	2141.3	3.330683
North End, 1885	43 47 03.396	104.8	357 18 19.8	177 18 25.6	Carson Tree	4017.7	3.603978
	124 10 19.885	444.7	6 45 02.5	186 44 49.0	Diercks	3742.4	3.573156
			8 04 39.1	188 04 31.1	Schroader	1834.7	3.263573
			17 30 51.3	197 30 14.7	Wreck Tacoma	3930.0	3.594393
Corral, 1885	43 44 07.783	240.2	45 48 16.1	225 46 49.4	Sand Hill 3	3915.5	3.592792
	124 06 05.168	115.7	78 26 55.4	258 25 22.0	Brushy Hill	3085.5	3.489323

Umpqua River—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Cliff, 1885	43 44 56.772	1752.2	331 00 22.5	151 00 48.4	Corral	1728.5	3.237674
	124 08 42.607	953.3	24 54 06.0	204 53 05.2	Sand Hill 3	4676.6	3.669928
			45 43 46.5	225 42 39.0	Brushy Hill	3051.5	3.484520
Marsh, 1885	43 44 56.648	1748.3	25 14 54.1	205 14 32.1	Corral	1667.4	3.222028
	124 07 33.388	747.0	60 21 02.7	240 19 07.3	Brushy Hill	4296.8	3.633149
			90 08 54.9	270 08 07.0	Cliff	1548.7	3.189964
Gardiner, 1885	43 44 01.299	40.1	95 30 55.6	275 29 51.5	Corral	2085.4	3.319195
	124 06 32.412	725.4	120 27 13.5	300 25 43.5	Cliff	3379.1	3.528906
			141 23 23.2	321 22 41.1	Marsh	2186.3	3.339701
Leeds, 1885	43 44 04.416	136.3	144 26 42.8	324 26 07.1	Cliff	1986.3	3.298038
	124 07 50.985	1141.1	193 43 28.9	13 43 41.1	Marsh	1659.4	3.219953
			273 07 26.6	93 08 20.9	Gardiner	1761.0	3.245769
Umpquah, 1885	43 42 33.258	1026.4	148 24 50.4	328 23 57.0	Leeds	3302.9	3.518899
	124 06 33.681	754.1	163 12 11.7	343 11 30.5	Marsh	4622.8	3.664901
			180 35 55.4	0 35 56.3	Gardiner	2717.3	3.434144
Supplementary points.							
						1403.5	3.147199
Breakwater, 1885	43 43 18.167	560.7	9 02 43.7	189 02 36.9	Umpquah	2417.2	3.383315
	124 06 23.826	533.4	126 12 05.3	306 11 05.1	Leeds	4348.2	3.638312
			134 25 50.2	314 24 14.3	Cliff		
Cannery smokestack, 1885	43 43 35.446	1094.0	177 29 24.3	357 29 20.9	Marsh	2508.5	3.399418
	124 07 28.478	637.4	237 32 36.6	57 33 15.3	Gardiner	1487.0	3.172312
			327 24 40.5	147 25 18.4	Umpquah	2277.8	3.357515
Mill, smokestack, 1885	43 43 54.907	1694.6	355 26 22.1	175 26 28.3	Umpquah	2527.9	3.402762
	124 06 42.659	954.7	100 52 15.0	280 51 27.8	Leeds	1557.0	3.192295
			125 26 15.9	305 24 53.0	Cliff	3293.9	3.517710
			149 13 15.8	329 12 40.8	Marsh	2218.0	3.345960
Old Mill smokestack, 1885	43 43 37.199	1148.1	116 08 07.1	296 07 14.2	Leeds	1907.4	3.280452
	124 06 34.467	771.5	130 35 25.1	310 33 56.5	Cliff	3775.4	3.576965
			151 44 13.1	331 43 32.4	Marsh	2784.0	3.444676
Smith River,[1] 1885	43 42 36.81	1136.1	87 15 42	267 14 31	Umpquah	2283.5	3.358598
	124 04 51.80	1159.7	121 47 39	301 46 35	Breakwater	2423.4	3.384433

Umpqua River to Coos Bay.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points.							
Coos Bay Tree, 1885	43 26 20.130	621.2	301 57 58.6	121 59 38.0	Simpson	3835.9	3.583867
	124 15 51.313	1154.0	328 27 53.1	148 28 35.9	Pony	2678.6	3.427906
			19 22 12.8	199 21 49.1	Hutchinson 2	2342.0	3.369581
Lagoon, 1885	43 26 23.693	731.2	313 47 22.2	133 48 30.5	Simpson	3094.1	3.490537
	124 15 05.943	133.7	350 58 11.7	170 58 23.3	Pony	2423.1	3.384378
			83 51 14.0	263 50 42.8	Coos Bay Tree	1026.2	3.011236
North Sand 2, 1885	43 26 40.240	1241.8	339 39 43.6	159 40 13.6	Simpson	2828.5	3.451550
	124 14 10.352	232.8	16 41 03.0	196 40 36.4	Pony	3031.3	3.481635
			67 47 07.0	247 46 28.8	Lagoon	1350.4	3.130461
			74 43 16.0	254 42 06.6	Coos Bay Tree	2353.7	3.371748
Lion Tree, 1885	43 27 24.511	756.4	4 26 41.6	184 26 32.0	Simpson	4030.6	3.605367
	124 13 12.767	287.0	43 28 00.5	223 27 20.9	North Sand 2	1882.3	3.274692
Late, 1885	43 28 09.563	295.1	327 11 02.2	147 11 29.6	Lion Tree	1654.3	3.218617
	124 13 52.645	1183.4	353 49 48.4	173 50 06.2	Simpson	5440.3	3.735623
			8 13 09.8	188 12 57.6	North Sand 2	2785.2	3.444859
Unknown, 1885	43 27 41.101	1268.4	253 31 28.2	73 32 59.2	Late	3099.5	3.491287
	124 16 04.873	109.6	277 31 17.3	97 33 15.7	Lion Tree	3902.9	3.591392
			306 05 53.1	126 07 11.9	North Sand 2	3187.1	3.503400
			330 58 44.8	150 59 25.5	Lagoon	2731.8	3.436447
			353 02 29.9	173 02 39.4	Coos Bay Tree	2517.4	3.400953
Kilstrom, 1885	43 28 54.100	1669.6	298 17 33.8	118 18 51.9	Late	2898.9	3.462232
	124 15 46.205	1038.4	308 42 10.2	128 43 55.7	Lion Tree	4420.4	3.645458
			10 33 09.3	190 32 56.4	Unknown	2291.6	3.360139
Whale, 1885	43 29 58.137	1794.2	330 12 04.4	150 13 03.1	Late	3861.0	3.586699
	124 15 18.006	404.5	329 17 29.1	149 18 55.1	Lion Tree	5513.7	3.741441
			17 46 45.7	197 46 26.3	Kilstrom	2075.3	3.317091
Brushy Ridge, 1885	43 29 20.395	629.4	47 17 51.2	227 16 38.6	Late	3222.7	3.508214
	124 12 07.283	163.7	80 39 14.8	260 36 44.1	Kilstrom	4986.1	3.697757
			105 13 27.0	285 11 15.7	Whale	4440.7	3.647455
Jarvis, 1885	43 31 29.889	922.4	319 24 11.7	139 25 56.6	Brushy Ridge	5262.0	3.721152
	124 14 39.668	890.8	16 55 09.1	196 54 42.7	Whale	2959.7	3.471241
			17 16 36.3	197 15 50.5	Kilstrom	5034.9	3.701968
Doe, 1885	43 31 50.319	1552.9	29 46 14.3	209 44 39.0	Kilstrom	6264.4	3.796880
	124 13 27.797	624.2	35 34 30.7	215 33 14.8	Whale	4256.0	3.629003
			68 40 07.9	248 39 18.4	Jarvis	1732.7	3.238728

[1] No check on this position.

Umpqua River to Coos Bay—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Wheeler, 1885	43 32 41.926	1293.9	328 06 26.6	148 06 57.0	Doe	1875.8	3.273181
	124 14 11.931	267.9	15 39 08.1	195 38 49.0	Jarvis	2308.8	3.363377
Camp Hill, 1885	43 33 50.406	1555.6	18 42 44.0	198 42 05.5	Doe	3912.8	3.592486
	124 12 31.895	715.8	33 29 43.8	213 28 15.8	Jarvis	5199.4	3.715956
			46 44 39.8	226 43 30.9	Wheeler	3083.6	3.489054
Ten Mile, 1885	43 34 20.248	624.9	301 31 21.5	121 32 07.6	Camp Hill	1761.2	3.245810
	124 13 38.790	870.4	356 56 46.1	176 56 53.7	Doe	4633.6	3.665923
			13 46 35.8	193 46 13.0	Wheeler	3124.2	3.494743
Sea Lion, 1885	43 35 44.059	1359.7	345 13 33.8	165 14 02.2	Camp Hill	3627.4	3.559696
	124 13 13.111	294.1	12 33 33.1	192 33 15.4	Ten Mile	2649.9	3.423235
Indian 2, 1885	43 36 12.150	375.0	14 01 36.1	194 01 02.5	Camp Hill	4508.8	3.654064
	124 11 43.201	968.9	36 54 45.9	216 53 26.2	Ten Mile	4318.6	3.635348
			66 44 46.5	246 43 44.5	Sea Lion	2195.1	3.341453
Hammock, 1885	43 36 42.869	1323.0	336 20 58.6	156 21 11.4	Indian 2	1035.0	3.014924
	124 12 01.712	38.4	26 19 59.9	206 18 53.0	Ten Mile	4910.8	3.691150
			41 25 41.4	221 24 52.2	Sea Lion	2420.4	3.383890
Bear, 1885	43 37 44.267	1366.2	332 55 47.6	152 56 17.4	Hammock	2127.9	3.327955
	124 12 44.895	1006.5	9 40 53.6	189 40 34.2	Sea Lion	3763.4	3.575584
Faun 2, 1885	43 37 26.250	810.1	1 34 57.8	181 34 55.9	Indian 2	2287.8	3.359409
	124 11 40.383	905.4	19 39 34.7	199 39 20.0	Hammock	1421.7	3.152803
			33 24 28.6	213 23 24.7	Sea Lion	3777.7	3.577224
			111 02 08.5	291 01 24.0	Bear	1549.5	3.190200

Coos Bay.

Principal points.							
Mill, 1906	43 23 16.604	512.4	267 26 53.7	87 30 37.1	Noah	7328.5	3.865017
	124 13 14.903	335.4	341 38 09.4	161 38 25.3	Marshfield Hill	1658.7	3.219777
White Point 3, 1906	43 22 12.536	386.9	137 31 16.0	317 30 20.8	Mill	2681.1	3.428321
	124 11 54.459	1226.1	247 19 49.9	67 22 38.1	Noah	5972.1	3.776128
			107 22 08.6	287 21 29.3	Marshfield Hill	1350.0	3.130340
Pierce, 1863	43 24 01.553	47.9	2 51 45.4	182 51 40.3	White Point 3	3368.5	3.527443
	124 11 46.986	1057.3	54 58 28.5	234 57 28.1	Mill	2416.4	3.383175
			26 11 34.2	206 10 49.8	Marshfield Hill	3300.2	3.518538
Porter, 1889	43 23 55.949	1726.6	264 30 59.1	84 31 54.2	Pierce	1812.5	3.258279
	124 13 07.162	161.2	352 52 47.3	172 52 57.9	Marshfield Hill	2810.2	3.448731
			332 50 42.1	152 51 32.0	White Point 3	3586.5	3.554672
Stump, 1889	43 24 12.984	400.7	279 39 59.7	99 41 02.9	Pierce	2099.0	3.322021
	124 13 18.939	426.2	349 30 47.0	169 31 05.7	Marshfield Hill	3370.5	3.527694
Dewey, 1862	43 24 18.720	577.7	285 04 08.8	105 05 08.9	Pierce	2036.6	3.308915
	124 13 14.379	323.5	346 59 13.8	166 59 18.8	Porter	721.3	2.858095
Mabry, 1862	43 25 39.133	1207.7	348 54 13.7	168 54 31.7	Pierce	3068.8	3.486654
	124 12 13.232	297.7	20 51 48.5	200 51 11.5	Porter	3407.7	3.532464
			29 00 24.0	208 59 42.0	Dewey	2837.4	3.452924
			29 04 52.4	209 04 07.2	Stump	3042.0	3.483157
North Bend 2, 1889	43 25 14.526	448.3	236 05 35.6	56 06 10.1	Mabry	1361.5	3.134034
	124 13 03.466	78.0	322 36 34.5	142 37 27.1	Pierce	2834.2	3.452401
Russell, 1862	43 26 02.037	62.9	298 35 06.5	118 35 46.1	Mabry	1477.1	3.169405
	124 13 10.895	245.0	333 04 33.3	153 05 31.0	Pierce	4170.0	3.620138
			353 29 51.6	173 29 56.7	North Bend 2	1475.7	3.169008
North Slough '89, 1889	43 25 55.706	1719.2	262 48 29.8	82 49 17.2	Russell	1562.2	3.193736
	124 14 19.808	445.5	280 10 20.7	100 11 47.8	Mabry	2892.6	3.461286
			336 37 53.8	156 38 35.7	Stump	3453.2	3.538225
Simpson, 1862	43 25 14.300	441.3	136 54 31.0	316 53 54.4	North Slough '89	1750.0	3.243043
	124 13 26.653	599.6	193 31 35.5	13 31 46.3	Russell	1515.3	3.180643
			245 06 01.2	65 06 51.6	Mabry	1820.7	3.260248
Pony, 1862	43 25 06.148	189.7	203 15 36.0	23 15 56.1	North Slough '89	1664.8	3.221353
	124 14 49.038	1103.2	231 59 23.0	52 00 30.4	Russell	2801.5	3.447392
			262 15 42.5	82 16 39.1	Simpson	1870.3	3.271919
North Slough, 1862	43 25 58.422	1803.0	317 30 19.1	137 30 57.2	Simpson	1846.5	3.266359
	124 14 22.103	497.1	20 35 13.5	200 34 55.0	Pony	1723.2	3.236347
Ridge, 1863	43 25 36.276	1119.5	247 06 14.0	67 07 03.5	North Slough	1757.1	3.244806
	124 15 34.073	766.4	250 14 44.4	70 15 35.5	North Slough '89	1774.8	3.249143
			283 18 00.3	103 19 27.9	Simpson	2945.4	3.469144
			312 32 28.0	132 32 59.0	Pony	1375.1	3.138322
Hutchinson, 1862	43 25 08.423	259.9	233 35 58.9	53 36 34.5	Ridge	1448.7	3.160966
	124 16 25.911	582.9	240 59 56.7	61 01 21.7	North Slough	3183.8	3.502947
			242 45 54.5	62 47 21.2	North Slough '89	3189.9	3.503774
			271 50 09.8	91 51 16.4	Pony	2180.4	3.338542

Coos Bay—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Tophet, 1862	43 24 39.709	1225.5	126 33 06.4	306 32 29.9	Hutchinson	1488.1	3.172636
	124 15 32.772	737.3	179 02 22.6	359 02 21.7	Ridge	1746.0	3.242032
			213 11 43.5	33 12 32.0	North Slough	2903.1	3.462861
Henderson, 1861	43 24 44.112	1361.4	211 19 33.8	31 19 47.8	Hutchinson	878.3	2.943656
	124 16 46.210	1039.7	225 13 22.0	45 14 11.6	Ridge	2285.8	3.359045
			274 41 38.0	94 42 28.5	Tophet	1657.9	3.219546
Cemetery, 1861	43 24 06.694	206.6	141 58 36.1	321 58 08.5	Henderson	1466.0	3.166120
	124 16 06.075	136.7	166 48 58.6	346 48 45.0	Hutchinson	1956.6	3.291506
			194 35 37.8	14 35 59.8	Ridge	2856.8	3.455882
			215 23 16.6	35 24 29.6	North Slough '89	4127.2	3.615652
Coos Bay north base, 1861	43 24 17.188	530.4	195 54 45.5	15 54 52.7	Henderson	864.0	2.936528
	124 16 56.739	1276.7	249 47 38.4	69 48 36.1	Tophet	2013.1	3.303861
			285 51 09.7	105 51 44.5	Cemetery	1185.2	3.073778
Coos Bay south base, 1861	43 23 58.846	1816.1	207 03 38.1	27 03 59.9	Henderson	1568.7	3.195548
	124 17 17.930	403.4	220 06 35.7	40 06 50.3	Coos Bay north base	740.1	2.869305
			261 28 28.2	81 29 17.6	Cemetery	1635.0	3.213520
Telegraph, 1862	43 23 56.677	1749.1	92 58 47.0	272 58 07.6	Coos Bay south base	1290.0	3.110587
	124 16 20.683	465.5	127 57 46.8	307 57 22.0	Coos Bay north base	1029.0	3.012434
			158 34 45.2	338 34 27.6	Henderson	1572.5	3.196601
Ridge 2, 1889	43 25 36.617	1130.0	252 42 50.4	72 43 48.3	North Slough '89	1983.5	3.297425
	124 15 44.012	989.9	282 33 10.8	102 34 45.2	Simpson	3165.7	3.500465
			307 14 36.0	127 15 13.8	Pony	1553.5	3.191325
			10 08 32.6	190 08 17.5	Cemetery	2819.2	3.450123
Hutchinson 2, 1889	43 25 08.537	263.5	227 21 02.9	47 21 31.6	Ridge 2	1279.2	3.106938
	124 16 25.841	581.3	242 48 30.0	62 49 56.6	North Slough '89	3186.9	3.503366
			271 55 46.6	91 56 53.1	Pony	2179.0	3.338252
			346 52 49.9	166 53 03.5	Cemetery	1959.7	3.292185
Pest, 1889	43 24 10.408	321.2	220 08 12.1	40 08 58.3	Hutchinson 2	2346.7	3.370463
	124 17 33.085	744.5	233 12 30.4	53 14 43.2	North Slough '89	5428.3	3.734663
			273 20 31.2	93 21 31.0	Cemetery	1961.3	3.292546
Empire 2, 1889	43 23 44.577	1375.7	120 13 21.7	300 12 39.9	Pest	1583.9	3.199738
	124 16 32.263	726.1	183 11 27.7	3 11 32.1	Hutchinson 2	2595.1	3.414156
			197 25 32.9	17 26 06.0	Ridge 2	3624.1	3.559200
Midway, 1889	43 22 44.169	1363.1	171 41 05.9	351 40 54.0	Pest	2689.7	3.429702
	124 17 15.799	355.7	207 43 26.5	27 43 56.4	Empire 2	2106.1	3.323479
Grove, 1889	43 23 07.918	244.4	209 38 25.2	29 38 58.7	Pest	2218.9	3.346145
	124 18 21.852	491.9	245 20 58.9	65 22 14.2	Empire 2	2713.6	3.433547
			296 14 00.4	116 14 45.8	Midway	1657.7	3.219501
Pigeon 2, 1889	43 21 41.655	1285.5	176 30 56.5	356 30 51.5	Grove	2667.1	3.426033
	124 18 14.651	329.9	191 30 58.4	11 31 26.9	Pest	4685.0	3.670710
			214 28 34.8	34 29 15.2	Midway	2340.4	3.369294
			211 16 22.7	31 17 33.0	Empire 2	4438.8	3.647266
North Spit, 1889	43 21 55.334	1707.6	205 32 03.6	25 32 36.2	Grove	2482.5	3.394897
	124 19 09.394	211.5	239 28 43.6	59 30 01.6	Midway	2968.5	3.472533
			288 53 58.5	108 54 36.1	Pigeon 2	1302.9	3.114920
Fossil 2, 1889	43 21 29.456	909.0	138 40 14.6	318 39 53.2	North Spit	1063.6	3.026761
	124 18 38.200	860.2	186 54 17.8	6 54 29.0	Grove	3060.8	3.485837
			218 48 50.5	38 49 47.1	Midway	2959.4	3.471209
Surf, 1889	43 22 27.793	857.7	259 37 40.7	79 39 05.0	Midway	2810.1	3.448728
	124 19 18.592	418.6	314 40 40.0	134 41 23.9	Pigeon 2	2024.8	3.306389
			333 11 42.2	153 12 09.9	Fossil 2	2017.0	3.304705
			348 19 06.2	168 19 12.5	North Spit	1022.9	3.009829
Coos Head 2, 1889	43 21 05.138	158.6	204 33 16.7	24 33 52.4	Surf	2804.5	3.447861
	124 20 10.360	233.3	221 32 35.6	41 33 17.5	North Spit	2069.9	3.315953
			246 36 02.8	66 37 22.3	Pigeon 2	2839.0	3.453163
			250 06 40.5	70 07 43.8	Fossil 2	2207.0	3.343798
Empire 3, 1909	43 23 44.585	1376.0	31 17 17.8	211 16 07.5	Pigeon 2	4438.9	3.647275
	124 16 32.273	726.5	65 21 49.4	245 20 34.1	Grove	2713.5	3.433531
Jetty, 1909	43 21 48.857	1507.8	204 51 05.0	24 51 39.4	Grove	2688.9	3.429582
	124 19 12.058	271.5	225 11 18.0	45 13 07.8	Empire 3	5068.8	3.704909
			279 45 04.2	99 45 43.6	Pigeon 2	1311.6	3.117809
Ocean, 1909	43 22 17.223	531.5	303 58 05.0	123 58 54.7	Pigeon 2	1964.2	3.293190
	124 19 26.995	607.8	338 58 56.6	158 59 06.9	Jetty	937.8	2.972098
Coos Head 3, 1909	43 21 05.116	157.9	203 40 52.3	23 41 22.0	Ocean	2430.0	3.385600
	124 20 10.345	233.0	224 11 30.3	44 12 10.3	Jetty	1882.8	3.274812
			246 35 09.6	66 36 29.0	Pigeon 2	2838.9	3.453156
Cape Arago Lighthouse, 1909	43 20 30.006	926.0	230 54 29.6	50 56 33.8	Ocean	5249.3	3.720102
	124 22 27.957	629.7	241 06 06.6	61 08 21.1	Jetty	5038.4	3.702294
			248 47 23.8	68 50 17.7	Pigeon 2	6118.3	3.786632
			250 43 05.3	70 44 39.8	Coos Head 3	3283.4	3.516321

Coos Bay—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Crawford 2, 1889	43 23 22.559	696.2	52 17 50.5	232 16 41.1	Marshfield Hill	2874.1	3.458502
	124 11 10.683	240.5	111 28 11.1	291 26 51.1	Porter	2816.7	3.449734
			145 49 47.1	325 49 22.1	Pierce	1454.5	3.162719
Timmermann, 1889	43 21 56.221	1735.1	117 36 26.3	297 35 33.4	Marshfield Hill	1956.4	3.291455
	124 11 34.684	781.2	150 36 44.1	330 35 40.6	Porter	4240.9	3.627462
			175 54 21.7	355 54 13.2	Pierce	3877.8	3.588580
			191 27 38.1	11 27 54.6	Crawford 2	2718.7	3.434362
White Point 2, 1889	43 22 12.545	387.2	107 21 30.3	287 20 51.0	Marshfield Hill	1349.8	3.130279
	124 11 54.463	1226.3	152 51 29.7	332 50 39.8	Porter	3586.2	3.554635
			182 51 47.6	2 51 52.7	Pierce	3368.3	3.527406
			204 30 51.8	24 31 21.9	Crawford 2	2374.8	3.375630
Isthmus 2, 1889	43 21 52.531	1621.2	141 09 07.3	321 08 42.2	Marshfield Hill	1310.1	3.117295
	124 12 15.189	342.1	162 55 47.1	342 55 11.4	Porter	3984.4	3.600361
			207 35 18.7	27 36 03.0	Crawford 2	3124.9	3.496229
			217 04 12.1	37 04 26.3	White Point 2	774.1	2.888908
Marsh, 1889	43 21 22.544	695.7	178 09 16.7	358 09 14.8	Marshfield Hill	1946.7	3.289297
	124 12 48.906	1101.5	218 27 34.6	38 28 12.0	White Point 2	1970.8	3.294633
			219 21 44.6	39 22 07.8	Isthmus 2	1197.0	3.078101
Coos, 1863	43 22 28.513	880.0	60 33 37.2	240 32 43.4	Timmermann	2027.1	3.306877
	124 10 16.280	366.6	88 32 18.0	268 30 31.3	Marshfield Hill	3499.9	3.544056
			143 43 04.6	323 42 27.3	Crawford 2	2069.2	3.315803
Grass, 1889	43 21 59.753	1843.9	104 39 44.6	284 38 11.6	Marshfield Hill	3152.8	3.498701
	124 10 36.206	815.2	163 06 32.5	343 06 08.9	Crawford 2	2670.7	3.426626
			206 48 48.7	26 49 02.4	Coos	994.5	2.997601
Coos River Hill, 1889	43 21 59.255	1828.7	90 34 35.6	270 33 48.5	Grass	1544.9	3.188898
	124 09 27.596	621.4	100 02 59.0	290 00 38.9	Marshfield Hill	4666.4	3.668980
			129 29 06.9	309 28 33.5	Coos	1420.1	3.152316
			137 56 15.3	317 55 04.6	Crawford 2	3463.3	3.539491
Loggie, 1889	43 20 54.853	1692.8	147 58 04.5	327 57 26.3	Grass	2362.7	3.373409
	124 09 40.549	913.4	164 26 54.6	344 26 30.1	Coos	3000.3	3.477168
			188 20 53.1	8 21 02.0	Coos River Hill	2008.8	3.302935
Ross, 1889	43 21 03.350	103.4	170 28 54.7	350 28 45.8	Grass	1765.0	3.246733
	124 10 23.244	523.5	183 24 50.5	3 24 55.3	Coos	2632.9	3.420430
			215 59 12.0	35 59 50.2	Coos River Hill	2132.4	3.328859
			285 14 57.5	205 15 26.8	Loggie	996.7	2.998559
Violet, 1862	43 25 02.089	64.5	190 45 55.3	10 46 05.4	North Slough	1769.6	3.247885
	124 14 36.799	827.9	226 14 15.0	46 15 14.0	Russell	2675.2	3.427357
			256 33 44.3	76 34 32.5	Simpson	1622.4	3.210160
Branch, 1863	43 24 42.183	1301.8	146 44 48.1	326 44 35.8	Violet	734.6	2.866067
	124 14 18.893	425.2	178 14 34.4	358 14 32.2	North Slough	2353.9	3.371791
			211 49 15.3	31 50 02.0	Russell	2000.5	3.462477
			229 51 08.8	49 51 44.7	Simpson	1537.4	3.186795
Supplementary points.							
Haynes,[1] 1862	43 27 06.833	210.9	7 47 51.3	187 47 36.8	Simpson	3505.3	3.544734
	124 13 05.513	124.0	37 17 00.1	217 16 09.0	North Slough '89	2758.6	3.440681
Charleston 2, 1889	43 20 49.314	1521.9	189 09 01.5	9 09 16.4	Surf	3078.3	3.488317
	124 19 40.337	908.1	198 52 41.5	18 53 02.7	North Spit	2153.3	3.333106
			228 28 35.5	48 29 18.1	Fossil 2	1868.9	3.271595
Bluff (U. S. E.), 1907	43 20 49.866	1538.9	89 02 24.5	269 01 53.7	Charleston 2	1012.0	3.005189
	124 18 55.412	1248.0	143 49 39.5	323 49 13.6	Curve (U. S. E.)	1440.1	3.158395
Curve (U. S. E.), 1907	43 21 27.534	849.7	7 48 23.6	187 48 18.7	Charleston 2	1190.5	3.075739
	124 19 33.157	746.7	200 59 45.9	21 00 03.9	Grass Mound (U. S. E.)	1647.6	3.216856
			267 14 59.4	87 15 37.1	Fossil 2	1239.0	3.093069
Grass Mound (U. S. E.), 1907	43 22 17.377	536.3	32 39 06.5	212 38 18.9	Coos Head 2	2647.6	3.422849
	124 19 06.936	156.2	218 11 11.3	38 11 35.5	Nelson (U. S. E.)	1285.8	3.109182
			313 06 51.4	133 07 27.3	Pigeon 2	1612.8	3.207582
			336 22 02.4	156 22 22.7	Fossil 2	1614.2	3.207960
Nelson (U. S. E.), 1907	43 22 50.124	1546.9	217 49 06.8	37 49 46.3	Marsh (U. S. E.)	2000.7	3.301176
	124 18 31.623	711.8	284 03 58.9	104 04 46.9	Midway Point (U. S. E.)	1620.8	3.209734
			349 44 53.4	169 45 05.1	Pigeon 2	2147.3	3.331887
Midway Point (U. S. E.), 1907	43 22 37.353	1152.8	34 42 22.1	214 41 45.8	Pigeon 2	2090.8	3.320307
	124 17 21.785	490.4	170 05 22.2	350 05 11.7	Marsh (U. S. E.)	2004.3	3.301973
			202 41 43.5	22 42 10.4	Empire Dock (U. S. E.)	2282.6	3.358435
Marsh (U. S. E.), 1907	43 23 41.331	1275.5	224 19 04.5	44 19 24.8	Sand Beach (U. S. E.)	952.4	2.978800
	124 17 37.114	835.2	263 52 33.7	83 53 11.1	Empire Dock (U. S. E.)	1232.7	3.090860
Empire Dock (U. S. E.), 1907	43 23 45.588	1406.9	134 28 18.7	314 28 01.6	Sand Beach (U. S. E.)	785.1	2.894905
	124 16 42.651	959.8	229 20 56.9	49 21 16.3	Lookout Point (U. S. E.)	838.3	2.923424
Sand Beach (U. S. E.), 1907	43 24 03.409	105.2	208 17 05.4	28 17 22.0	Jarvis (U. S. E.)	1150.9	3.061027
	124 17 07.546	169.8	270 10 45.7	90 11 22.2	Lookout Point (U. S. E.)	1196.3	3.077830

[1] No check on this position.

Coos Bay—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Mabry (U. S. E.), 1907	43 25 39.132	1207.7	100 11 49	280 10 21	North Slough '89	2892.7	3.461302
	124 12 13.228	297.5	118 35 43	298 35 04	Russell	1477.2	3.169437
			348 54 20	168 54 38	Pierce	3068.7	3.486957
Lookout Point (U. S. E.), 1907	43 24 03.284	101.3	147 23 40.5	327 23 20.6	Jarvis (U. S. E.)	1207.6	3.081939
	124 16 14.386	323.7	218 52 54.2	38 53 36.0	Pony Point (U. S. E.)	2183.2	3.339086
Jarvis (U. S. E.), 1907	43 24 36.248	1118.6	204 19 29.6	24 19 47.2	Henderson (U. S. E.)	1401.5	3.146608
	124 16 43.308	974.4	251 20 40.8	71 21 42.5	Pony Point (U. S. E.)	2133.2	3.329022
Pony Point (U. S. E.), 1907	43 24 58.348	1800.7	149 48 56.9	329 48 35.9	Ridge	1366.3	3.135547
	124 15 13.472	303.1	228 37 58.0	48 38 22.5	Island (U. S. E.)	1066.9	3.028111
Henderson (U. S. E.), 1907	43 25 17.630	544.1	232 14 18.5	52 14 41.6	Ridge	956.9	2.980877
	124 16 17.644	396.9	292 23 41.7	112 24 25.8	Pony Point (U. S. E.)	1561.5	3.193537
Island (U. S. E.), 1907	43 25 21.194	654.1	107 44 57.0	287 44 11.5	Ridge	1561.9	3.193658
	124 14 37.878	852.1	200 53 12.0	20 53 24.4	North Slough '89	1140.0	3.056896
			270 41 00.5	90 42 01.5	Hay Barn (U. S. E.)	1970.0	3.294476
Hay Barn (U. S. E.), 1907	43 25 20.423	630.3	124 51 56.1	304 51 07.5	North Slough '89	1905.1	3.279923
	124 13 10.310	231.9	179 24 41.4	359 24 41.0	Russell	1284.3	3.108682
			245 46 56.3	65 47 35.6	Mabry (U. S. E.)	1407.8	3.148555
North Bend (U. S. E.), 1907	43 24 12.718	392.4	156 48 58.8	336 48 17.2	North Slough '89	3457.7	3.538784
	124 13 19.287	434.0	209 07 26.7	29 08 12.1	Mabry (U. S. E.)	3053.0	3.484725
			279 24 38.5	99 25 41.9	Pierce	2105.4	3.323337
			298 02 40.5	118 04 08.9	Crawford Point (U. S. E.)	3279.2	3.515768
			349 21 23.0	169 21 42.0	Marshfield Hill	3363.9	3.526840
Stave Mill (U. S. E.), 1907	43 23 11.840	365.4	232 19 47.5	52 20 48.2	Pierce	2510.9	3.399831
	124 13 15.306	344.5	339 34 07.6	159 34 23.8	Marshfield Hill	1523.1	3.182724
Crawford Point (U. S. E.), 1907	43 23 22.740	701.8	24 27 16.0	204 26 43.3	White Point 3	2380.0	3.376582
	124 11 10.698	240.8	52 12 18.8	232 11 09.4	Marshfield Hill	2877.3	3.458981
Marshfield U. S. G. S. bench mark, 1906.	43 22 08.434	260.3	156 34 31.0	336 34 24.0	Marshfield Hill	577.0	2.761199
	124 12 41.501	934.4	249 42 24.0	69 45 44.5	Noah	7004.3	3.845362
			263 10 49.4	83 11 21.7	White Point 3	1066.7	3.028033
Marshfield front range, 1906	43 22 34.121	1053.0	143 03 13.2	323 02 43.1	Mill	1640.6	3.214993
	124 12 31.092	700.0	162 10 52.1	342 10 27.3	Porter	2652.6	3.423666
			308 55 22.7	128 55 47.8	White Point 3	1060.1	3.025365
Marshfield rear range, 1906	43 22 40.196	1240.5	137 49 45.0	317 49 14.0	Mill	1516.1	3.180728
	124 12 29.682	668.2	160 09 34.2	340 09 08.5	Porter	2485.5	3.395422
			317 06 17.2	137 06 41.4	White Point 3	1165.1	3.066376
Barker, 1889	43 20 49.868	1539.0	89 02 08.1	269 01 37.3	Charleston 2	1011.9	3.005128
	124 18 55.417	1248.2	170 12 17.2	350 12 01.3	Surf	3066.8	3.486681
			171 08 46.0	351 08 36.4	North Spit	2044.7	3.310631
Quicksand, 1889	43 23 09.428	291.0	273 40 10.9	93 40 33.0	Grove	727.7	2.861974
	124 18 54.117	1218.2	341 50 09.7	161 50 36.8	Pigeon 2	2850.7	3.454958
			23 12 41.1	203 12 24.3	Surf	1398.0	3.145518
Fall, 1889	43 24 02.456	75.8	257 07 10.1	77 07 42.9	Pest	1103.8	3.041902
	124 18 20.795	468.0	0 48 37.9	180 48 37.2	Grove	1679.4	3.226149
			24 37 27.1	204 37 04.3	Quicksand	1800.1	3.255304
Stave Mill stack, 1889	43 23 10.589	326.8	262 15 05.8	82 16 28.8	Crawford 2	2743.9	3.438361
	124 13 11.479	258.4	293 34 24.6	113 36 58.3	Coos River Hill	5499.9	3.740355
			315 55 39.4	135 56 32.3	White Point 2	2492.9	3.396707
			342 12 43.4	162 12 57.0	Marshfield Hill	1458.4	3.163876
Odd Fellows Monument, 1889	43 21 38.657	1193.0	194 13 49.5	14 14 00.7	Marshfield Hill	1494.3	3.174433
	124 13 08.006	180.3	219 28 03.5	39 29 24.1	Crawford 2	4154.2	3.618492
			237 43 03.5	57 43 54.0	White Point 2	1958.5	3.291927
			250 11 42.1	70 12 18.4	Isthmus 2	1264.0	3.101755
Merchants tank, 1889	43 21 54.744	1689.6	221 36 09.1	41 37 22.5	Crawford 2	3624.7	3.559275
	124 12 57.611	1297.2	248 52 07.2	68 52 50.5	White Point 2	1524.3	3.183058
			274 05 08.2	94 05 37.3	Isthmus 2	957.7	2.981207
Lutheran church spire, 1889	43 22 08.213	253.5	180 05 30.6	0 05 30.6	Marshfield Hill	536.3	2.729407
	124 12 51.728	1164.6	224 44 33.9	44 45 43.3	Crawford 2	3230.8	3.509311
			264 04 26.7	84 05 06.0	White Point 2	1296.2	3.112678
			300 27 44.9	120 28 10.0	Isthmus 2	954.5	2.979772
Schoolhouse cupola, 1889	43 22 12.252	378.1	226 30 40.4	46 31 50.2	Crawford 2	3153.3	3.498761
	124 12 52.327	1178.0	269 35 45.4	89 36 25.1	White Point 2	1302.8	3.114881
			306 02 39.6	126 03 05.1	Isthmus 2	1034.2	3.014609
Slaughterhouse east gable, 1889	43 23 42.107	1299.4	251 47 13.6	71 48 09.3	Pierce	1916.5	3.283501
	124 13 08.070	181.6	282 51 03.9	102 52 24.6	Crawford 2	2709.9	3.432959
			329 03 05.8	149 03 56.4	White Point 2	3222.5	3.508194
Marshfield cannery, 1889	43 23 03.532	109.0	339 48 15.5	159 48 27.6	Coos	1151.5	3.061256
	124 10 33.988	763.9	33 21 52.8	213 21 11.1	Timmermann	2487.0	3.395679
			69 19 38.5	249 18 03.9	Marshfield Hill	3314.7	3.520439

Coos Bay—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Spring, 1889	43 24 55.319	1707.2	225 15 18.6	45 16 39.3	Coos Bay Tree	3718.8	3.570408
	124 17 48.761	1097.0	257 39 26.3	77 40 23.3	Hutchinson 2	1909.5	3.280929
			345 43 12.7	165 43 23.5	Pest	1426.9	3.155391
			383 50 19.4	203 49 57.4	Fall	1783.5	3.251281
Summer, 1889	43 25 59.623	1840.0	251 06 30.4	71 07 27.0	Coos Bay Tree	1955.4	3.291244
	124 17 13.580	305.4	21 44 41.4	201 44 17.3	Spring	2136.5	3.329697
Winter, 1889	43 26 50.392	1555.1	210 43 52.6	30 45 04.0	Unknown	1820.6	3.260220
	124 16 46.282	1040.7	307 03 59.3	127 04 37.1	Coos Bay Tree	1549.3	3.190122
			21 23 54.3	201 23 35.5	Summer	1682.8	3.226022
Lookout, 1889	43 23 56.697	1749.8	29 19 24.5	209 18 46.2	Midway	2567.1	3.409439
	124 16 19.951	449.0	104 25 33.8	284 24 43.6	Pest	1699.2	3.230257
			176 34 47.2	356 34 43.2	Hutchinson 2	2221.0	3.346552
			216 20 21.7	36 21 44.3	North Slough '89	4560.2	3.658980

Port Orford.

Principal points.							
Arch Rock, 1869	42 46 44.012	1358.1	209 57 23.0	29 59 28.6	Sixes	8401.7	3.924368
	124 35 45.777	1040.6	299 24 03.8	119 27 44.9	Heads	8502.1	3.929528
			299 37 26.2	119 40 49.2	Port Orford south base	7826.5	3.893566
Blanco, 1869	42 50 07.676	236.8	335 59 49.5	156 02 08.6	Heads	11451.1	4.058848
	124 33 44.920	1020.2	23 36 51.6	203 35 29.5	Arch Rock	6858.4	3.836221
Bluff, 1869	42 49 55.756	1720.5	31 56 50.6	211 55 00.3	Arch Rock	6971.8	3.843345
	124 33 03.492	79.3	111 21 18.2	291 20 50.0	Blanco	1010.3	3.004429
			200 32 39.9	20 32 55.2	Sixes	1453.7	3.162469
			342 21 39.2	162 23 12.0	Port Orford south base	10271.0	4.011613
Port Orford north base, 1869	42 48 19.897	614.0	62 13 22.2	242 10 34.5	Arch Rock	6344.0	3.802362
	124 31 38.858	882.9	139 16 53.8	319 15 28.1	Blanco	4388.8	3.642350
			146 59 05.4	326 58 07.9	Bluff	3527.9	3.547521
			350 08 20.2	170 08 55.6	Port Orford south base	6933.1	3.840929
West, 1869	42 50 23.599	728.2	252 08 08.7	72 08 55.4	Sixes	1637.2	3.214100
	124 33 49.648	1127.5	309 20 02.1	129 20 33.5	Bluff	1355.4	3.132053
			347 40 21.5	167 40 24.7	Blanco	502.9	2.701514
Wilson, 1869	42 51 20.788	641.5	24 13 33.1	204 13 16.1	Sixes	1384.6	3.141323
	124 32 16.007	363.5	50 19 02.8	230 17 59.1	West	2763.2	3.441416
Rocky Point, 1869	42 52 31.024	957.3	8 40 08.5	188 39 58.6	Wilson	2192.4	3.340917
	124 32 01.452	33.0	14 40 53.7	194 40 26.8	Sixes	3545.7	3.549707
			32 00 12.4	211 58 58.8	West	4636.3	3.666170
Best Rock, 1869	42 47 28.325	874.0	253 48 04.3	73 50 48.3	Port Orford north base	5712.4	3.756816
	124 35 40.277	915.4	308 05 53.6	125 09 13.0	Port Orford south base	8486.4	3.928721
			5 13 25.9	185 13 22.2	Arch Rock	1373.1	3.137701
Port Orford astronomic, 1869	42 44 28.919	892.4	88 26 13.2	268 26 03.1	Heads	338.7	2.529817
	124 30 05.243	119.4	154 29 22.3	334 26 53.1	Blanco	11584.4	4.063874
Round, 1860	42 46 52.420	1617.5	87 36 57.7	267 33 53.5	Arch Rock	6171.8	3.790409
	124 31 14.510	329.8	168 25 02.7	348 24 46.2	Port Orford north base	2755.5	3.440193
Pine Hill, 1869	42 46 09.287	286.6	99 25 26.2	279 22 12.8	Arch Rock	6562.6	3.817073
	124 31 00.977	22.2	167 56 41.2	347 56 15.5	Port Orford north base	4121.3	3.615029
Arch Rock Summit, 1869	42 46 44.274	1366.2	202 09 01.6	22 10 21.1	Cape	6971.0	3.843292
	124 35 47.661	1083.4	242 25 11.8	62 28 00.8	Port Orford north base	6378.1	3.804693
			299 31 14.6	119 34 39.0	Port Orford south base	7867.7	3.895848
			301 39 25.5	121 49 03.6	Bald	22763.7	4.357242
Cape Blanco Lighthouse, 1907	42 50 14.934	460.8	267 02 34.4	87 06 26.5	Madden	7765.4	3.890164
	124 33 45.969	1043.9	336 20 14.9	156 22 34.7	Heads	11665.7	4.066909
			71 48 26.6	251 48 22.6	Cape	142.4	2.153636
Port Orford south base, 1869	42 44 38.531	1189.0	157 51 06.9	337 49 01.1	Cape	11160.9	4.047700
	124 30 46.654	1061.1	198 51 58.6	18 53 48.8	Madden	11389.7	4.056512
Castle Rock, 1907	42 51 25.607	790.1	323 29 56.5	143 37 31.8	Bald	25674.9	4.409509
	124 32 47.428	1076.7	354 07 08.2	174 07 12.6	Sixes	1418.8	3.151923
			33 21 25.9	213 20 42.0	Cape	2664.0	3.425535

San Sebastian to Chetko River.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Dolan, 1873	42 18 06.349	195.9	196 18 45.0	16 20 16.8	Grizzly	11099.4	4.045300
	124 24 08.147	186.6	256 53 23.2	76 55 30.9	Sundown 2	4460.9	3.649421
Red Rock, 1873	42 15 09.482	292.5	151 34 12.9	331 32 46.1	Dolan	6206.3	3.792833
	124 21 59.153	1356.0	180 35 42.7	0 35 47.6	Grizzly	16110.0	4.207095
			192 07 54.7	12 08 35.5	Sundown 2	6615.6	3.820568
Sundown, 1873	42 18 38.318	1182.3	12 01 56.6	192 01 16.3	Red Rock	6588.2	3.818768
	124 20 59.240	1356.7	77 10 30.2	257 08 23.0	Dolan	4437.8	3.647164
			217 03 43.2	37 03 43.7	Sundown 2	30.203	1.480050
Cape Sebastian pole, 1907	42 19 41.410	1277.7	172 34 21.7	352 31 23.9	Port Orford astronomic	46289.8	4.665485
	124 25 42.243	967.3	286 27 13.6	106 30 24.7	Sundown 2	6777 2	3.831049
			323 41 13.6	143 42 17.0	Dolan	3639.6	3.561051
Crooks Point, 1872	42 15 08.310	256.4	186 45 59.2	6 46 18.4	Dolan	5531.9	3.742876
	124 24 36.602	839.0	217 31 33.8	37 34 00.1	Sundown	8172.6	3.912362
			269 24 41.6	89 26 27.5	Red Rock	3609.5	3.557445
San Sebastian, 1873	42 19 41.484	1280.0	286 42 46.6	106 45 57.2	Sundown	6766.9	3.830390
	124 25 42.225	966.8	323 42 50.4	143 43 53.7	Dolan	3641.2	3.561243
			349 52 50.2	169 53 34.3	Crooks Point	8561.8	3.932564
Cove, 1873	42 19 23.755	733.0	331 34 10.3	151 34 48.3	Dolan	2715.8	3.433894
	124 25 04.594	105.2	122 24 51.2	302 24 25.9	San Sebastian	1020.6	3.008860
Cove Island, 1873	42 18 54.232	1673.4	211 30 03.4	31 30 19.8	Cove	1068.4	3.028742
	124 25 28.975	663.5	308 35 06.0	128 36 00.4	Dolan	2368.5	3.374472
Schumacher, 1873	42 18 47.043	1451.6	339 02 08.4	159 02 22.4	Dolan	1344.6	3.128585
	124 24 29.150	667.8	99 12 09.2	279 11 28.9	Cove Island	1387.9	3.142363
			135 07 02.4	315 06 13.1	San Sebastian	2371.0	3.374939
			144 22 49.1	324 22 25.2	Cove	1393.6	3.144124
Fairview, 1873	42 20 01.972	60.8	344 35 45.1	164 36 13.8	Dolan	3700.4	3.568249
	124 24 51.059	1168.9	347 45 17.8	167 45 32.6	Schumacher	2365.8	3.373970
			14 43 35.1	194 43 26.0	Cove	1219.2	3.086082
Crooks Hill, 1872	42 14 41.356	1276.1	111 05 29.6	291 04 26.3	Crooks Point	2312.0	3.363990
	124 23 02.502	57.4	158 27 08.8	338 25 21.4	San Sebastian	9957.3	3.998140
			166 37 39.5	346 36 55.3	Dolan	6501.5	3.813011
			201 06 37.8	21 08 00.8	Sundown	7838.0	3.894207
			239 08 00.2	59 08 42.8	Red Rock	1691.8	3.228350
Bluff, 1873	42 17 25.293	780.4	148 09 50.6	328 09 00.5	Cove Island	3230.4	3.509259
	124 24 14.567	333.7	186 37 15.2	6 37 19.5	Dolan	1275.3	3.105621
			341 54 38.0	161 55 26.5	Crooks Hill	5321.0	3.725996
			6 48 55.1	186 48 40.3	Crooks Point	4256.6	3.629063
Loma, 1873	42 17 17.010	524.8	348 43 41.7	168 44 09.8	Crooks Hill	4897.1	3.689938
	124 23 44.253	1013.7	16 48 54.5	196 48 19.3	Crooks Point	4148.3	3.617869
			110 12 11.0	290 11 50.6	Bluff	740.0	2.869242
			160 13 32.2	340 13 16.2	Dolan	1617.8	3.208916
Pistol River, 1873	42 16 44.912	1385.8	338 16 44.0	158 17 28.6	Crooks Hill	4103.5	3.613152
	124 24 06.742	200.3	12 05 38.0	192 05 19.3	Crooks Point	3048.2	3.484048
			173 53 13.2	353 53 09.3	Bluff	1253.1	3.097974
			209 31 51.8	29 32 08.3	Loma	1138.3	3.056263
Crook, 1873	42 16 55.356	1708.1	347 42 16.3	167 42 42.8	Crooks Hill	4231.5	3.626497
	124 23 41.807	957.9	20 49 22.9	200 48 46.1	Crooks Point	3533.5	3.548209
			62 25 58.8	242 25 40.7	Pistol River	696.2	2.842762
			140 54 23.6	320 54 01.6	Bluff	1190.2	3.075623
			175 12 19.7	355 12 18.1	Loma	670.5	2.826411
Dune, 1873	42 16 01.023	31.6	17 28 37.2	197 28 22.2	Crooks Point	1705.1	3.231756
	124 24 14.263	326.9	185 20 13.3	5 20 17.0	Pistol River	1360.1	3.133562
			203 55 19.2	23 55 41.0	Crook	1834.0	3.263399
Sandflower, 1873	42 15 37.265	1149.8	321 25 25.2	141 26 05.6	Crooks Hill	2206.4	3.343686
	124 24 02.512	57.6	41 10 41.4	221 10 18.5	Crooks Point	1186.9	3.074417
			159 49 38.9	339 49 31.0	Dune	781.0	2.892626
Lookout, 1873	42 16 16.051	495.3	337 48 39.1	157 49 14.1	Crooks Hill	3155.4	3.499049
	124 23 54.480	1248.5	8 44 45.0	188 44 39.6	Sandflower	1210.8	3.083074
			44 21 29.4	224 21 16.1	Dune	648.5	2.811913
			159 50 50.5	339 50 40.9	Pistol River	948.6	2.977070
Macks Arch, highest point, 1873	42 13 43.819	1352.1	183 41 53.8	3 42 09.2	Dolan	8117.2	3.909407
	124 24 31.005	711.0	208 06 44.3	28 09 07.4	Sundown 2	10331.3	4.014155
			228 48 42.1	48 49 41.6	Crooks Hill	2696.2	3.430759
Macks Point, 1872	42 14 31.439	970.0	142 02 48.8	322 02 22.8	Crooks Point	1442.8	3.159219
	124 23 57.892	1327.3	256 26 53.1	76 27 30.3	Crooks Hill	1306.3	3.116033
Ridge Knob, 1872	42 13 38.619	1191.6	130 07 31.1	310 06 34.4	Macks Point	2529.2	3.402990
	124 22 33.541	769.2	161 04 04.3	341 03 44.8	Crooks Hill	2046.4	3.311001
Snodgrass, 1872	42 13 44.353	1368.5	84 25 07.1	264 24 14.2	Ridge Knob	1816.6	3.259258
	124 21 14.702	337.1	125 26 38.9	305 25 26.4	Crooks Hill	3033.6	3.481964
Rocky Prairie, 1872	42 12 01.773	54.7	141 28 57.2	321 27 47.6	Ridge Knob	3819.6	3.582018
	124 20 49.817	1142.9	169 46 45.1	349 46 28.4	Snodgrass	3216.1	3.507329

San Sebastian to Chetko River—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Burnt Point, 1872	42 11 55.868	1723.8	176 12 17.1	356 12 11.0	Ridge Knob	3177.3	3.502059
	124 22 24.370	559.1	265 11 23.3	85 12 26.8	Rocky Prairie	2176.9	3.337847
Smith Hill, 1871	42 09 12.795	394.8	162 04 24.3	342 03 36.7	Burnt Point	5288.4	3.723326
	124 21 13.422	308.2	185 55 48.4	5 56 04.3	Rocky Prairie	5241.8	3.719478
Bush Mound, 1872	42 09 14.353	442.8	89 14 52.4	269 13 07.4	Smith Hill	3591.9	3.555321
	124 18 36.990	849.2	149 27 56.3	329 26 27.1	Rocky Prairie	5998.1	3.778012
Red Mound, 1872	42 07 23.262	717.7	126 52 24.8	306 50 13.0	Smith Hill	5634.5	3.750855
	124 17 57.102	1311.6	165 02 27.8	345 02 01.0	Bush Mound	3547.9	3.549971
Bellevue, 1871	42 06 50.594	1561.0	170 58 17.0	350 57 56.6	Smith Hill	4442.6	3.647634
	124 20 43.057	789.2	255 10 29.3	75 12 20.6	Red Mound	3943.3	3.595861
Sister Knob, 1871	42 05 33.659	1038.5	150 24 29.2	330 23 49.9	Bellevue	2729.9	3.436150
	124 19 44.377	1019.9	216 04 35.7	36 05 47.7	Red Mound	4184.6	3.621650
Black Mound, 1872	42 05 52.868	1631.2	81 28 41.0	261 26 45.8	Sister Knob	3991.9	3.601184
	124 16 52.591	1208.4	152 01 08.6	332 00 25.4	Red Mound	3158.4	3.499462
High Mound, 1870	42 04 07.524	232.1	152 23 23.2	332 22 42.7	Sister Knob	2999.3	3.477018
	124 18 43.892	1009.1	218 11 42.6	38 12 57.3	Black Mound	4136.3	3.616608
Miller, 1870	42 04 03.799	117.2	92 05 43.0	272 04 10.9	High Mound	3162.3	3.499997
	124 16 26.434	607.7	169 52 22.9	349 52 05.4	Black Mound	3418.5	3.533830
New, 1872	42 09 50.166	1547.8	288 56 13.6	108 57 47.7	Bush Mound	3402.6	3.531812
	124 20 57.171	1312.4	17 55 50.4	197 55 39.5	Smith Hill	1211.9	3.083466
Sheep, 1871	42 09 23.634	729.2	229 55 55.6	49 56 24.1	New	1271.9	3.104446
	124 21 39.573	908.5	299 06 53.9	119 07 11.5	Smith Hill	687.2	2.837107
Head Island, 1871	42 08 21.570	665.5	181 07 58.0	1 07 59.1	Sheep	1915.3	3.282232
	124 21 41.222	946.7	201 59 25.7	21 59 44.4	Smith Hill	1704.5	3.231606
Trail, 1871	42 07 31.614	975.4	353 00 43.8	173 00 48.3	Bellevue	1275.1	3.105548
	124 20 49.809	1144.1	142 33 00.6	322 32 26.0	Head Island	1941.7	3.288175
			170 08 54.7	350 08 38.8	Smith Hill	3168.6	3.500867
Sand Hill, 1871	42 07 06.473	199.7	161 30 49.0	341 30 26.2	Head Island	2443.2	3.387951
	124 21 07.488	172.0	207 37 55.5	27 38 07.4	Trail	875.6	2.942283
			311 07 04.1	131 07 20.5	Bellevue	745.0	2.872175
Cresswell, 1871	42 06 08.617	265.9	175 33 20.3	355 33 16.2	Sand Hill	1790.5	3.252966
	124 21 01.448	33.3	198 04 06.1	18 04 18.4	Bellevue	1362.3	3.134275
Barnacle Rock, 1871	42 06 40.041	1235.4	185 44 57.5	5 45 06.6	Head Island	3148.4	3.498091
	124 21 54.956	1262.6	223 14 17.9	43 15 01.6	Trail	2184.4	3.339331
			258 50 37.5	78 51 25.7	Bellevue	1683.6	3.226239
			308 15 20.4	128 15 56.3	Cresswell	1565.7	3.194714
Elk, 1872	42 10 08.276	255.3	301 47 32.6	121 47 50.0	New	1060.5	3.025517
	124 21 36.438	836.4	342 50 39.3	162 50 54.8	Smith Hill	1791.5	3.253222
Thomas Hill, 1872	42 10 20.755	640.4	334 54 56.2	154 55 09.1	New	1042.1	3.017897
	124 21 16.416	376.8	50 02 45.0	230 02 31.5	Elk	599.5	2.777810
Deep Gulch, 1872	42 11 01.116	34.4	154 18 52.8	334 18 29.0	Burnt Point	1874.6	3.272905
	124 21 48.956	1123.4	215 56 20.6	35 57 00.3	Rocky Prairie	2311.7	3.363933
			329 02 47.2	149 03 09.1	Thomas Hill	1452.1	3.161987
			350 00 17.4	170 00 25.8	Elk	1655.4	3.218916
Green Hill, 1871	42 06 23.013	710.0	88 34 13.7	268 33 21.8	Head Island	1775.8	3.249406
	124 20 23.916	549.2	143 29 50.4	323 29 26.2	Smith Hill	1910.9	3.281231
Seal Point,[1] 1872	42 11 25.28	780.0	147 52 41.9	327 52 24.6	Burnt Point	1114.6	3.047105
	124 21 58.54	1343.2	234 27 33.2	54 28 19.4	Rocky Prairie	1937.6	3.287272
Thomas Point, 1872	42 10 07.336	226.4	165 25 15.3	345 24 49.8	Burnt Point	3460.1	3.539094
	124 21 46.408	1065.3	200 11 17.1	20 11 55.1	Rocky Prairie	3762.1	3.575434
Red Bush, 1871	42 06 24.519	756.5	60 14 40.8	240 14 15.8	Cresswell	988.5	2.994974
	124 20 24.101	553.8	151 34 21.2	331 34 08.5	Bellevue	914.8	2.961324
Lone Knob, 1871	42 06 11.689	360.6	85 47 31.4	265 46 53.9	Cresswell	1290.2	3.110658
	124 20 05.450	125.2	132 43 50.4	312 43 37.9	Red Bush	583.4	2.765962
			144 15 20.5	324 14 55.3	Bellevue	1479.0	3.169959
Sandy Point, 1871	42 05 34.854	1075.4	135 09 07.1	315 08 36.9	Cresswell	1469.4	3.167142
	124 20 16.350	375.7	173 22 14.5	353 22 09.3	Red Bush	1542.7	3.188270
			192 25 40.1	12 25 47.4	Lone Knob	1163.8	3.065866
			272 52 17.5	92 52 28.2	Sister Knob	735.7	2.866999
Acorn, 1871	42 05 57.399	1786.4	57 57 16.9	237 56 43.8	Sandy Point	1339.9	3.127068
	124 19 26.930	618.8	115 40 36.8	295 40 11.0	Lone Knob	982.1	2.992142
Black Point, 1871	42 05 18.814	580.5	147 25 11.7	327 25 02.5	Sandy Point	587.3	2.768871
	124 20 02.588	59.5	214 11 39.0	34 12 02.9	Acorn	1458.0	3.163754
			222 25 13.4	42 25 15.0	Sister Knob	620.4	2.792688

[1] No check on this position.

San Sebastian to Chetko River—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Bench, 1871	42 05 11.288	348.3	98 17 07.5	278 16 21.0	Black Point	1612.7	3.207549
	124 18 53.151	1221.4	120 23 11.6	300 22 26.6	Sister Knob	1364.7	3.135036
			151 38 38.1	331 38 15.5	Acorn	1634.3	3.213320
Flat Knoll, 1871	42 04 49.316	1521.6	125 15 48.8	305 15 11.3	Black Point	1576.6	3.197733
	124 19 06.575	151.1	147 35 11.0	327 34 35.0	Sister Knob	1620.7	3.209699
			204 28 11.3	24 28 20.3	Bench	744.8	2.872060
			337 59 09.8	157 59 25.0	High Mound	1390.9	3.143308
Low Point, 1871	42 04 27.183	838.7	141 50 48.6	321 50 12.1	Black Point	2025.9	3.306628
	124 19 08.131	186.9	182 59 57.3	2 59 58.3	Flat Knoll	683.8	2.834938
			194 11 54.0	14 12 04.0	Bench	1403.7	3.147272
			317 26 07.0	137 26 23.2	High Mound	823.7	2.915757
Taylor, 1871	42 05 09.932	306.4	109 29 31.6	289 29 09.0	Black Point	821.5	2.914588
	124 19 28.894	664.0	154 04 41.3	334 04 20.2	Sister Knob	814.0	2.910600
			267 04 50.5	87 05 14.4	Bench	822.6	2.915169
			321 06 43.0	141 06 57.9	Flat Knoll	817.2	2.912309
Hidden, 1871	42 04 22.672	699.6	61 11 44.1	241 11 19.3	High Mound	970.2	2.986870
	124 18 06.914	159.0	120 56 41.2	300 56 01.2	Flat Knoll	1598.9	3.203814
			127 44 25.5	307 43 30.6	Taylor	2382.6	3.377052
Loma, 1870	42 03 52.762	1628.0	102 51 31.8	282 50 33.6	High Mound	2047.4	3.311204
	124 17 17.070	392.5	124 44 20.1	304 43 06.7	Flat Knoll	3062.9	3.486135
			128 51 08.8	308 50 35.4	Hidden	1471.3	3.167707

Chetko River to Trinidad Head.

Principal points.							
North Chetko, 1870	42 02 38.992	1203.1	145 49 14.8	325 48 20.7	High Mound	3302.1	3.518787
	124 17 23.202	533.6	206 30 29.5	26 31 07.5	Miller	2924.1	3.465997
Red Point, 1870	42 01 44.857	1384.1	118 48 38.8	298 47 10.3	North Chetko	3467.2	3.539976
	124 15 11.109	255.6	158 00 13.5	337 59 23.0	Miller	4623.6	3.664982
Fence, 1870	42 03 20.194	623.1	43 00 30.5	229 59 56.0	North Chetko	1738.3	3.240125
	124 16 31.647	727.7	185 05 26.0	5 05 29.5	Miller	1350.7	3.130557
Cooley, 1870	42 02 21.244	655.4	103 13 39.7	283 12 31.8	North Chetko	2394.8	3.379269
	124 15 41.838	962.3	147 48 07.1	327 47 33.7	Fence	2149.5	3.332336
			327 48 05.8	147 48 26.4	Red Point	1326.6	3.122752
Pine Hill, 1870	42 02 41.192	1270.9	26 12 43.9	206 12 19.0	Red Point	1937.3	3.287193
	124 14 33.912	779.9	68 30 15.1	248 29 29.6	Cooley	1679.1	3.225086
			113 58 26.2	293 57 07.3	Fence	2962.9	3.471716
			134 34 45.5	314 33 30.1	Miller	3631.9	3.560133
Bare Ridge, 1870	42 02 00.318	9.8	76 18 55.5	256 17 58.5	Red Point	2015.1	3.304305
	124 13 45.997	1058.0	138 51 16.3	318 50 44.2	Pine Hill	1674.8	3.2239.3
North Winchuck, 1870	42 00 50.449	1556.5	124 03 54.7	304 01 30.4	North Chetko	5981.9	3.776836
	124 13 47.740	1098.5	131 12 00.0	311 11 04.2	Red Point	2548.9	3.406355
			181 03 56.0	1 03 57.2	Bare Ridge	2156.1	3.333660
Rocky Butte, 1870	42 01 19.155	591.0	118 09 16.6	298 08 33.5	Red Point	1681.0	3.225565
	124 14 06.682	153.7	200 32 16.6	20 32 30.5	Bare Ridge	1356.2	3.132339
			333 47 49.1	153 48 01.8	North Winchuck	987.1	2.994351
Otto, 1870	42 01 33.428	1031.4	9 54 36.0	189 54 29.3	North Winchuck	1346.1	3.129087
	124 13 37.672	866.6	56 35 00.8	236 34 41.4	Rocky Butte	799.6	2.902883
			167 00 07.0	347 00 01.5	Bare Ridge	851.4	2.930157
Henderson, 1870	42 00 56.036	1728.9	83 30 09.5	263 29 25.5	North Winchuck	1521.9	3.182388
	124 12 42.023	966.9	110 07 12.4	290 06 15.7	Rocky Butte	2074.3	3.316876
			132 01 35.4	312 00 58.1	Otto	1723.4	3.236393
Oregon-California Boundary Monument, 1869.	41 59 55.736	1719.6	15 39 34.6	195 39 11.7	Cone Rock	2911.5	3.464116
	124 12 29.498	678.9	133 09 39.9	313 08 47.5	North Winchuck	2468.1	3.392363
			171 11 42.3	351 11 33.9	Henderson	1882.7	3.274770
Northwest Seal Rock, 1870	41 50 14.746	454.9	196 57 25.7	17 00 49.2	North Chetko	24009.5	4.380283
	124 22 27.675	638.6	205 14 41.0	25 19 32.7	Red Point	23548.0	4.371954
			211 22 08.3	31 27 55.8	North Winchuck	22982.6	4.361400
Pyramid, 1870	41 57 05.256	162.2	48 05 02.5	227 58 14.7	Northwest Seal Rock	18938.1	4.277336
	124 12 16.910	389.5	155 05 11.3	335 03 14.8	Red Point	9512.9	3.978315
			163 15 32.4	343 14 31.7	North Winchuck	7255.7	3.860681
Peak, 1870	41 59 15.294	471.9	131 15 56.0	311 14 18.7	North Winchuck	4452.5	3.648604
	124 11 22.289	513.2	149 27 04.4	329 26 11.1	Henderson	3609.5	3.557445
Cone Rock, 1870	41 58 24.872	767.4	167 16 01.5	347 15 32.0	North Winchuck	4604.8	3.663217
	124 13 03.631	83.6	236 17 41.6	56 18 49.4	Peak	2804.2	3.447802
			336 20 30.4	156 21 01.6	Pyramid	2681.6	3.428401
Boulder, 1870	41 59 35.258	1087.8	38 12 49.9	218 12 00.2	Cone Rock	2763.7	3.441'84
	124 11 49.379	1136.6	314 38 45.3	134 39 03.4	Peak	876.5	2.9427.2

Chetko River to Trinidad Head—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Bush, 1870	41 59 27.060	834.9	27 22 27.8	207 21 58.9	Cone Rock	2160.6	3.334566
	124 12 20.484	471.5	250 32 21.8	70 32 42.6	Boulder	759.3	2.880426
Hillside, 1870	41 58 34.853	1075.3	80 29 47.6	260 28 54.2	Cone Rock	1863.7	3.270370
	124 11 43.798	1008.4	152 20 05.4	332 19 40.9	Bush	1818.7	3.259766
			176 03 24.4	356 03 20.7	Boulder	1868.1	3.271403
Low Dune, 1870	41 57 34.487	1064.0	356 38 23.9	176 38 25.5	Pyramid	903.4	2.955890
	124 12 19.209	442.4	321 54 05.6	141 54 18.9	Head	742.3	2.870593
Island, 1870	41 57 05.600	172.8	220 04 37.8	40 04 59.6	Low Dune	1164.8	3.066258
	124 12 51.773	1192.5	270 45 14.9	90 45 38.3	Pyramid	803.0	2.904741
			355 40 59.0	175 41 16.5	Cone	8001.3	3.903159
Cone, 1870	41 52 46.998	1449.9	71 21 58.1	251 15 16.4	Northwest Seal Rock	14659.0	4.166104
	124 12 25.653	591.5	181 26 51.8	1 26 57.6	Pyramid	7970.5	3.901487
Head, 1870	41 57 15.553	479.9	51 53 48.8	231 53 37.1	Pyramid	514.8	2.711635
	124 11 59.322	1366.3	75 44 35.5	255 44 00.4	Island	1246.5	3.095678
			141 54 18.9	321 54 05.6	Low Dune	742.3	2.870593
Last, 1870	41 58 21.462	662.2	4 00 00.8	183 59 57.9	Low Dune	1452.8	3.162222
	124 12 14.808	341.0	19 59 22.0	199 58 57.3	Island	2490.6	3.396296
Patch, 1870	41 57 48.531	1497.3	24 04 28.4	204 04 15.2	Head	1114.4	3.047042
	124 11 39.584	911.6	64 36 12.8	244 35 46.3	Low Dune	1010.2	3.004390
			141 24 11.3	321 23 47.7	Last	1300.1	3.113962
East, 1870	41 56 52.294	1613.4	13 35 40.5	193 34 47.5	Cone	7786.0	3.891312
	124 11 06.284	144.7	99 36 01.2	279 34 50.7	Island	2464.2	3.391668
			103 49 07.6	283 48 20.4	Pyramid	1675.2	3.224055
Low Rock, 1870	41 55 58.566	1806.9	198 27 48.7	18 28 08.6	Island	2180.5	3.338550
	124 13 21.755	501.2	215 58 21.5	35 59 04.8	Pyramid	2542.6	3.405283
			242 00 41.1	62 02 11.6	East	3533.7	3.548227
			347 39 14.7	167 39 52.2	Cone	6050.2	3.781770
Spur, 1870	41 55 25.730	793.8	119 45 01.7	299 44 10.3	Low Rock	2042.0	3.310065
	124 12 04.803	110.7	174 48 40.9	354 48 32.8	Pyramid	3083.3	3.489018
			182 08 01.8	2 08 05.4	Head	3390.7	3.530291
			206 46 42.8	26 47 21.9	East	2991.7	3.475922
Great Sand Dune, 1870	41 53 44.970	1387.5	13 42 59.2	193 42 46.6	Cone	1841.1	3.265073
	124 12 06.720	154.9	157 14 50.6	337 14 00.5	Low Rock	4469.9	3.650294
			193 32 31.6	13 33 12.0	East	5944.9	3.774144
Indian, 1870	41 49 06.758	208.5	99 53 54.3	279 48 05.2	Northwest Seal Rock	12261.5	4.088549
	124 13 44.162	1019.3	194 55 01.6	14 55 54.0	Cone	7032.1	3.847088
Eureka, 1870	41 51 41.421	1277.9	30 58 30.2	210 57 07.4	Indian	5564.7	3.745442
	124 11 40.072	924.2	152 33 01.1	332 32 30.7	Cone	2280.0	3.357933
Lake End, 1870	41 51 54.047	1667.4	188 44 47.3	8 44 54.6	Cone	1652.9	3.218250
	124 12 36.554	843.0	286 38 33.5	106 39 11.2	Eureka	1359.7	3.133436
Lake Earl north base, 1870	41 52 02.954	91.1	316 41 06.1	136 41 24.2	Eureka	913.0	2.960478
	124 12 07.228	166.7	67 53 25.7	247 53 06.1	Lake End	730.0	2.863340
Lake Earl south base, 1870	41 51 34.345	1059.6	140 48 52.3	320 48 38.0	Lake End	784.2	2.894454
	124 12 15.069	347.6	191 34 39.5	11 34 44.7	Lake Earl north base	901.0	2.954720
Gravel, 1870	41 50 36.935	1139.5	196 20 10.5	16 20 30.6	Lake End	2479.2	3.394308
	124 13 06.790	156.7	225 08 51.8	45 09 49.7	Eureka	2821.3	3.450449
			17 13 28.3	197 13 03.4	Indian	2912.7	3.464302
Burnt Ranch,[1] 1870	41 54 26.56	819.5	141 40 06	321 39 01	Low Rock	3619.0	3.558586
	124 11 44.33	1021.7	191 01 46	11 02 11	East	4580.8	3.660943
Ridge, 1870	41 50 48.698	1502.4	80 37 01.6	260 35 58.1	Gravel	2224.0	3.347130
	124 11 31.683	731.0	173 12 56.7	353 12 51.1	Eureka	1638.1	3.214337
Lake Mound, 1870	41 50 05.368	165.6	41 30 23.0	221 29 36.8	Indian	2414.4	3.382801
	124 12 34.837	803.9	142 52 38.6	322 52 17.3	Gravel	1221.5	3.086892
			179 19 22.3	359 19 21.1	Lake End	3353.2	3.525460
Squaw, 1870	41 49 27.188	838.8	72 26 57.6	252 26 00.0	Indian	2069.4	3.320016
	124 12 17.849	411.9	152 18 51.0	332 18 18.3	Gravel	2430.2	3.385637
			202 57 10.8	22 57 41.6	Ridge	2731.1	3.436334
Red Point, 1870	41 49 07.973	246.0	104 05 15.8	284 04 07.5	Squaw	2437.2	3.386887
	124 10 35.419	817.5	157 19 52.9	337 19 15.4	Ridge	3367.9	3.527358
			162 31 01.0	342 30 18.0	Eureka	4958.7	3.695366
Swamp, 1870	41 48 15.844	488.8	163 57 02.5	343 56 44.2	Squaw	2290.4	3.359914
	124 11 50.411	1163.7	227 05 51.7	47 06 41.7	Red Point	2362.8	3.373430
Lake, 1870	41 49 49.435	1525.2	194 51 58.0	14 52 09.2	Gravel	1516.2	3.180766
	124 13 23.652	545.8	246 25 09.8	66 25 42.3	Lake Mound	1229.0	3.089546
			19 46 26.0	199 46 12.3	Indian	1399.2	3.145873
Yank, 1870	41 49 14.948	461.2	77 48 46.9	255 48 18.0	Indian	1030.7	3.013155
	124 13 00.864	19.9	153 42 00.6	333 41 45.4	Lake	1186.9	3.074404

[1] No check on this position.

Chetko River to Trinidad Head—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Pine Bush, 1870	41 48 43.429	1339.8	174 50 45.9	354 50 44.0	Indian	722.7	2.858942
	124 13 41.350	954.4	223 51 14.9	43 51 41.9	Yank	1348.6	3.129893
Pond, 1870	41 48 31.998	987.2	80 46 59.6	260 46 48.2	Hut	398.4	2.600287
	124 13 42.083	971.4	133 53 38.1	313 53 29.2	Stick	425.3	2.628737
			182 44 38.6	2 44 39.9	Pine Bush	353.1	2.547898
			1 35 58.5	181 35 57.9	Forest Mound	682.1	2.833848
Stick, 1870	41 48 41.555	1282.0	198 23 12.6	18 23 20.1	Indian	819.4	2.913490
	124 13 55.361	1277.8	259 51 56.4	79 52 05.8	Pine Bush	328.5	2.516587
Hut, 1870	41 48 29.929	923.3	193 35 14.8	13 35 17.3	Stick	369.0	2.567074
	124 13 59.117	1364.6	224 33 19.4	44 33 31.3	Pine Bush	584.5	2.766812
Round, 1870	41 48 24.588	758.6	134 00 09.4	314 00 04.5	Hut	237.2	2.375169
	124 13 51.725	1194.0	170 53 28.7	350 53 26.3	Stick	530.2	2.724437
Skull, 1870	41 48 08.752	270.0	204 26 26.6	24 26 35.2	Hut	717.7	2.855936
	124 14 11.982	276.6	223 44 33.0	43 44 46.5	Round	676.3	2.830130
Forest Mound, 1870	41 48 09.898	305.3	86 59 14.9	266 58 55.5	Skull	672.1	2.827449
	124 13 42.908	990.5	148 48 24.8	328 48 14.0	Hut	722.5	2.858824
Pine, 1870	41 47 56.611	1746.5	160 52 57.8	340 52 54.0	Skull	396.4	2.598185
	124 14 06.358	146.8	232 51 50.8	52 52 06.4	Forest Mound	679.1	2.831912
Flag, 1870	41 47 55.943	1725.9	201 06 30.3	21 06 34.7	Skull	423.6	2.626956
	124 14 18.590	429.2	265 49 41.2	85 49 49.4	Pine	283.2	2.452024
Firknoll, 1870	41 47 45.687	1409.5	161 31 30.9	341 31 27.8	Flag	333.6	2.523275
	124 14 14.011	323.5	207 39 50.5	27 39 55.6	Pine	380.5	2.580400
Drift, 1870	41 47 47.303	1459.3	206 46 11.9	26 46 15.8	Flag	298.6	2.475042
	124 14 24.415	563.7	281 43 44.1	101 43 51.1	Firknoll	245.2	2.389762
Knob, 1870	41 47 37.635	1161.1	170 21 32.6	350 21 31.1	Drift	302.6	2.480809
	124 14 22.220	513.0	217 20 39.7	37 20 45.2	Firknoll	312.5	2.494802
Sand, 1869	41 47 35.525	1096.0	197 16 28.2	17 16 31.9	Drift	380.6	2.580417
	124 14 29.310	676.8	248 18 35.0	68 18 40.3	Knob	176.2	2.245808
			32 56 57.2	212 56 28.1	St. George	1857.4	3.268899
			114 01 44.0	293 56 25.1	Northwest Seal Rock	12084.7	4.082235
St. George, 1869	41 46 45.004	1388.4	122 51 43.1	302 46 53.4	Northwest Seal Rock	11938.5	4.076950
	124 15 13.054	301.5	205 07 49.2	25 08 48.5	Indian	4831.0	3.684037
St. George north base, 1869	41 47 00.057	1.8	52 10 20.5	232 10 03.3	St. George	757.2	2.879235
	124 14 47.154	1088.9	200 37 56.1	20 38 08.0	Sand	1169.3	3.067913
Woodedge, 1870	41 47 23.680	730.5	42 28 23.1	222 28 03.8	St. George north base	988.1	2.994779
	124 14 18.263	421.7	145 05 16.0	325 05 08.6	Sand	445.7	2.649001
			168 01 06.7	348 01 03.7	Knob	440.1	2.643591
Mound, 1869	41 46 46.728	1441.7	87 25 58.3	267 25 24.2	St. George	1185.5	3.073914
	124 14 21.771	502.8	125 03 09.2	305 02 52.3	St. George north base	716.1	2.854955
			173 24 13.7	353 24 08.7	Sand	1515.4	3.180564
			184 03 45.6	4 03 48.0	Woodedge	1142.9	3.058015
Shell, 1869	41 47 06.900	212.9	245 03 22.9	65 03 55.0	Woodedge	1227.8	3.089121
	124 15 06.477	149.6	295 19 08.9	115 19 21.8	St. George north base	493.6	2.693384
			12 40 19.0	192 40 14.6	St. George	692.4	2.840362
St. George south base, 1869	41 46 39.129	1207.2	112 10 39.1	292 10 26.3	St. George	480.2	2.681453
	124 14 53.798	1242.5	193 21 50.9	13 21 55.3	St. George north base	663.7	2.821952
			252 24 32.0	72 24 53.3	Mound	775.9	2.889816
Castle Rock, 1869	41 45 41.887	1292.2	170 33 23.9	350 33 14.6	St. George	1974.0	3.295356
	124 14 59.029	1363.6	191 04 25.4	11 04 45.2	Sand	3572.5	3.552975
Connection Rock, 1869	41 44 51.355	1584.3	132 07 46.1	312 06 56.4	Castle Rock	2324.4	3.366308
	124 13 44.406	1026.0	149 43 20.2	329 42 21.2	St. George	4060.5	3.608575
			278 35 14.0	98 36 18.4	Crescent City Lighthouse	2255.4	3.353229
Preston 2, 1869	41 45 05.210	160.7	69 57 25.9	249 56 52.1	Connection Rock	1246.9	3.095834
	124 12 53.708	1240.9	111 21 33.6	291 20 10.1	Castle Rock	3108.5	3.492547
			305 49 57.8	125 50 28.4	Crescent City Lighthouse	1305.9	3.115897
Wynell, 1869	41 46 13.652	421.2	47 23 07.4	227 22 36.7	Castle Rock	1447.3	3.160568
	124 14 12.921	298.4	124 51 41.5	304 51 01.5	St. George	1692.5	3.228518
			168 40 28.4	348 40 22.5	Mound	1040.7	3.017340
			319 04 51.8	139 05 44.6	Preston 2	2794.1	3.446247
			345 27 10.6	165 27 29.6	Connection Rock	2623.1	3.418812
White, 1869	41 46 24.913	768.6	138 38 10.0	318 37 54.3	St. George	825.9	2.916929
	124 14 49.421	1141.4	223 29 32.8	43 29 51.2	Mound	927.8	2.967443
			292 23 38.2	112 24 02.5	Wynell	911.8	2.959907
Point, 1869	41 46 20.949	646.3	158 40 50.7	338 40 42.4	St. George	796.7	2.901269
	124 15 00.513	11.8	244 28 52.3	64 28 59.7	White	283.9	2.453120
			281 34 13.9	101 34 45.6	Wynell	1122.0	3.050009

Chetko River to Trinidad Head—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Crescent City Lighthouse, 1913	41 44 40.428	1247.3	257 22 43.1	77 36 04.8	Gordon	28468.3	4.454862
	124 12 07.890	182.3	287 24 35.4	107 31 34.1	Child	15245.1	4.183130
Crescent City azimuth, 1871	41 44 49.567	1529.2	91 19 36.7	271 18 27.5	Connection Rock	2400.2	3.380249
	124 12 00.553	12.8	352 25 01.9	172 25 05.2	Steamboat Rock	869.6	2.939334
Battery Point 2, 1869	41 44 47.308	1459.5	43 15 46.7	223 15 41.1	Crescent City Lighthouse	291.4	2.464563
	124 11 59.246	1368.9	92 57 06.3	272 55 56.3	Connection Rock	2433.0	3.386142
			113 42 09.1	293 41 32.9	Preston 2	1374.2	3.138059
Steamboat Rock, 1859	41 44 21.626	667.2	110 03 01.9	290 01 49.4	Connection Rock	2676.5	3.427572
	124 11 55.587	1284.6	135 02 28.3	315 01 49.5	Preston 2	1900.4	3.278850
Whalers Island, 1859	41 44 25.975	801.4	83 58 47.4	263 58 10.8	Steamboat Rock	1278.3	3.106636
	124 11 00.574	13.3	117 42 46.0	297 42 06.1	Crescent City azimuth	1565.4	3.194630
Smyth 2, 1871	41 44 47.190	1455.9	40 50 03.4	220 49 47.1	Whalers Island	865.0	2.937033
	124 10 36.097	834.1	92 09 36.2	272 08 40.0	Crescent City azimuth	1952.8	3.290658
Ehroser 2, 1871	41 44 19.732	608.8	95 58 57.8	275 58 04.8	Whalers Island	1850.3	3.267245
	124 09 40.938	946.0	123 36 52.7	303 36 16.0	Smyth 2	1530.4	3.184808
Round Rock, 1859	41 43 56.772	1751.5	216 26 14.8	36 26 47.9	Smyth 2	1933.6	3.286361
	124 11 25.800	596.3	253 41 47.1	73 42 56.9	Ehroser 2	2524.7	3.402218
Alexander, 1871	41 43 14.978	462.1	109 54 47.4	289 53 04.8	Round Rock	3788.4	3.578455
	124 08 51.679	1194.5	150 19 37.7	330 19 04.9	Ehroser 2	2299.4	3.361614
Crescent City northeast base, 1859	41 45 09.589	295.8	27 55 52.8	207 55 30.2	Steamboat Rock	1674.8	3.223960
	124 11 21.639	499.9	340 06 43.5	160 06 57.5	Whalers Island	1430.9	3.155602
Smyth, 1859	41 44 47.195	1456.1	40 42 27.6	220 49 11.3	Whalers Island	865.1	2.937069
	124 10 36.100	834.1	66 45 52.7	246 44 59.8	Steamboat Rock	1999.0	3.300803
			123 17 40.8	303 17 10.5	Crescent City northeast base	1258.7	3.099930
Crescent City southwest base, 1859	41 44 52.893	1631.8	239 42 27.4	59 42 52.8	Crescent City northeast base	1021.3	3.009136
	124 11 59.807	1381.9	275 11 11.1	95 12 06.8	Smyth	1942.1	3.288265
			301 14 34.9	121 15 14.3	Whalers Island	1600.9	3.204369
Crescent City astronomical,[1] 1853	41 44 49.40	1524.1	235 08 44	55 09 10	Crescent City northeast base	1090.1	3.037456
	124 12 00.36	8.3	297 36 35	117 37 15	Whalers Island	1559.0	3.192840
Battery, 1859	41 44 47.313	1459.7	231 41 23.7	51 41 48.8	Crescent City northeast base	1108.7	3.044819
	124 11 59.294	1370.0	295 52 28.7	115 53 07.5	Whalers Island	1508.1	3.178427
			353 49 51.7	173 49 54.2	Steamboat Rock	797.1	2.901510
Preston,[1] 1859	41 45 05.16	159.2	294 47 58	114 49 14	Whalers Island	2880.7	3.459505
	124 12 53.74	1241.6	314 58 40	134 59 19	Steamboat Rock	1899.8	3.278708
Sister Rock, 1871	41 39 31.646	976.3	154 52 35.2	334 50 44.8	Round Rock	9035.4	3.955947
	124 08 39.810	921.1	177 43 11.6	357 43 03.7	Alexander	6895.6	3.838573
Long Point, 1871	41 40 26.297	811.3	25 04 13.3	205 03 50.6	Sister Rock	1861.4	3.269835
	124 08 05.721	132.3	144 33 06.2	324 30 53.1	Round Rock	7972.8	3.901613
White Knob, 1871	41 42 27.488	848.0	124 47 56.4	304 46 02.3	Round Rock	4828.6	3.683823
	124 08 34.233	791.4	164 36 42.5	344 36 31.0	Alexander	1519.7	3.181747
Woody Point, 1871	41 41 21.703	669.6	356 18 11.7	176 18 14.9	Long Point	1712.9	3.233731
	124 08 10.496	242.7	11 17 48.3	191 17 28.7	Sister Rock	3462.4	3.539382
			136 40 30.2	316 38 20.3	Round Rock	6578.4	3.818118
			164 52 09.5	344 51 53.7	White Knob	2102.5	3.322733
Green, 1871	41 40 09.370	289.1	38 17 00.0	218 16 33.6	Sister Rock	1482.6	3.171031
	124 08 00.109	2.5	166 02 26.7	346 02 23.0	Long Point	538.1	2.730861
Bush, 1871	41 39 37.617	1160.5	80 46 35.8	260 46 03.2	Sister Rock	1148.8	3.060239
	124 07 50.801	1175.4	167 36 10.3	347 36 04.1	Green	1003.0	3.001312
Point, 1871	41 36 59.217	1826.9	151 51 39.0	331 50 26.8	Sister Rock	5333.4	3.727007
	124 06 51.096	1183.0	164 12 59.2	344 12 19.5	Bush	5078.4	3.705731
Grant, 1871	41 37 41.874	1291.8	11 44 52.5	191 44 44.6	Point	1344.2	3.128457
	124 06 39.275	909.1	140 31 59.7	320 30 39.6	Sister Rock	4387.5	3.642218
Low, 1871	41 37 59.857	1846.6	313 33 12.3	133 33 29.1	Grant	805.2	2.905887
	124 07 04.484	103.8	350 35 34.0	170 35 42.9	Point	1896.3	3.277914
			142 05 22.0	322 04 18.7	Sister Rock	3589.6	3.555049
Near, 1871	41 39 32.346	997.9	340 26 43.0	160 26 40.2	Low	3028.3	3.481198
	124 07 48.294	1117.4	88 57 59.2	268 57 25.0	Sister Rock	1192.1	3.076326
			160 22 04.6	340 22 03.0	Bush	172.7	2.237182
Wilson, 1871	41 36 46.493	1434.4	110 51 46.3	290 51 16.8	Point	1102.4	3.042346
	124 06 06.602	152.9	156 07 23.9	336 07 02.2	Grant	1868.5	3.271495
Last, 1871	41 35 57.795	1783.0	146 32 58.6	326 32 22.7	Point	2271.2	3.356263
	124 05 57.022	1320.5	171 36 05.4	351 35 59.0	Wilson	1518.7	3.181468
Rock, 1872	41 34 46.378	1430.8	189 20 01.8	9 20 21.1	Point	4153.2	3.618386
	124 07 20.190	467.7	221 09 20.3	41 10 15.5	Last	2926.6	3.466370
			326 23 29.4	146 25 23.7	Flint Ridge	7217.9	3.858409
			334 15 37.5	154 17 20.8	High Bluff	8319.0	3.920071

[1] No check on this position.

Chetko River to Trinidad Head—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Halfway, 1872	41 34 41.206	1271.2	94 10 30.7	274 09 28.0	Rock	2196.2	3.341669
	124 05 45.638	1057.3	173 38 00.4	353 37 52.9	Last	2377.5	3.376124
Pine Ridge, 1873	41 34 09.251	285.4	119 26 43.5	299 25 45.4	Rock	2330.6	3.367461
	124 05 52.582	1218.3	189 16 00.0	9 16 04.6	Halfway	998.9	2.999513
			346 00 54.9	166 01 40.0	High Bluff	6542.8	3.815765
			14 46 24.8	194 43 14.3	Redding Rock	26239.8	4.418960
Council Mound, 1872	41 33 34.785	1073.2	346 18 53.1	166 19 19.5	Flint Ridge	3914.8	3.592711
	124 05 07.820	181.2	354 07 58.8	174 08 14.2	High Bluff	5313.6	3.725387
			125 46 21.2	305 44 53.4	Rock	3779.5	3.577430
			135 43 00.3	315 42 30.6	Pine Ridge	1485.4	3.171835
Flint Rock, 1872	41 31 29.993	925.3	151 46 44.1	331 45 11.1	Rock	6876.9	3.837391
	124 04 59.815	1386.9	177 14 28.8	357 14 23.6	Council Mound	3854.4	3.585962
			266 25 24.9	86 25 46.1	Flint Ridge	742.0	2.870424
			346 01 03.9	166 01 14.1	High Bluff	1479.6	3.170150
Council Point, 1872	41 33 33.554	1035.2	131 14 58.9	311 13 45.5	Rock	3408.2	3.532526
	124 05 29.577	685.4	265 41 08.5	85 41 23.0	Council Mound	505.6	2.703799
			349 44 21.8	169 44 41.5	Flint Rock	3873.9	3.588146
Klamath South, 1872	41 31 56.408	1740.2	37 28 51.0	217 28 33.1	Flint Rock	1026.8	3.011493
	124 04 32.865	761.9	143 32 02.1	323 30 11.2	Rock	6521.8	3.814365
			156 19 28.3	336 18 50.8	Council Point	3272.7	3.514900
			165 03 26.5	345 03 03.4	Council Mound	3141.4	3.497124
Redding Rock, 1874	41 20 26.686	823.3	194 43 14.3	14 46 24.8	Pine Ridge	26239.8	4.418960
	124 10 40.353	938.2	203 26 49.7	23 30 45.2	High Bluff	20745.0	4.316913
Split Rock, 1874	41 29 43.051	1328.1	27 14 13.0	207 10 01.7	Redding Rock	19298.3	4.285519
	124 04 20.482	475.1	163 25 33.3	343 25 17.4	High Bluff	1944.2	3.288745
Alder Butte, 1874	41 28 29.251	902.4	32 58 31.8	212 53 57.1	Redding Rock	17738.3	4.248912
	124 03 45.114	1046.8	160 11 03.0	340 10 39.5	Split Rock	2420.1	3.383829
			354 23 23.5	174 23 31.0	Johnson	2681.7	3.428410
Johnson, 1874	41 27 02.741	84.6	39 04 50.5	219 00 08.5	Redding Rock	15731.2	4.196763
	124 03 33.821	785.0	166 29 04.7	346 28 18.0	High Bluff	7003.2	3.845294
			174 23 31.0	354 23 23.5	Alder Butte	2681.7	3.428410
Upper Bluff, 1874	41 24 19.193	592.1	53 16 36.0	233 12 02.9	Redding Rock	11985.0	4.078639
	124 03 47.188	1096.1	183 31 09.4	3 31 18.2	Johnson	5055.0	3.703723
Mussel Point, 1874	41 19 21.411	660.5	104 31 35.1	284 27 53.9	Redding Rock	8045.0	3.905524
	124 05 05.405	125.7	191 11 11.9	11 12 03.6	Upper Bluff	9364.7	3.971493
Sharp Point, 1874	41 14 12.724	392.5	153 01 44.1	332 58 57.4	Redding Rock	12947.1	4.112171
	124 06 27.801	647.4	191 22 38.9	11 23 33.3	Mussel Point	9713.9	3.987395
Big Lagoon, 1870	41 09 26.477	816.8	170 16 37.4	350 14 58.4	Redding Rock	20664.6	4.315226
	124 08 10.254	239.1	195 07 08.7	15 08 16.2	Sharp Point	9147.4	3.961299
Patricks Pinnacle, 1870	41 08 21.482	662.7	201 57 14.8	21 59 18.3	Sharp Point	11684.0	4.067592
	124 09 35.378	825.1	224 42 17.7	44 43 13.7	Big Lagoon	2821.4	3.450408
Inner Turtle Rock, 1870	41 07 54.448	1679.7	233 52 11.9	53 54 01.7	Big Lagoon	4816.7	3.682749
	124 10 57.108	1332.0	246 21 49.3	66 22 43.1	Patricks Pinnacle	2080.7	3.318206
Patricks Point South, 1870	41 07 48.600	1499.3	96 32 10.6	276 31 26.2	Inner Turtle Rock	1586.3	3.200388
	124 09 49.541	1155.5	198 02 12.9	18 02 22.2	Patricks Pinnacle	1066.8	3.028081
Castle, 1870	41 06 19.764	609.7	36 26 25.9	216 26 05.9	Patricks Point south	1195.0	3.077364
	124 09 19.110	445.6	71 08 40.8	251 07 36.4	Inner Turtle Rock	2415.4	3.382990
			97 57 09.0	277 56 58.3	Patricks Pinnacle	383.1	2.583293
			217 57 18.9	37 58 04.2	Big Lagoon	2610.3	3.416688
Outer Turtle Rock, 1870	41 08 00.281	8.7	236 22 22.7	56 24 15.6	Big Lagoon	4803.6	3.681562
	124 11 01.799	42.0	252 00 55.1	72 01 52.0	Patricks Pinnacle	2119.1	3.326148
			255 54 12.4	75 55 20.0	Castle	2469.3	3.392576
Bight Tree, 1870	41 08 34.170	1054.1	65 22 03.5	245 21 36.2	Castle	1066.1	3.027781
	124 08 37.560	876.0	73 49 07.9	253 48 29.9	Patricks Pinnacle	1404.1	3.147388
			201 31 54.6	21 32 12.6	Big Lagoon	1734.7	3.239227
Sugar Loaf, 1870	41 08 19.019	586.7	37 50 17.8	217 49 57.3	Patricks Point south	1188.1	3.074870
	124 09 18.294	426.6	100 47 58.2	280 47 47.0	Patricks Pinnacle	405.6	2.608123
			140 22 57.5	320 22 57.0	Castle	29.9	1.475084
			217 19 00.8	37 19 45.6	Big Lagoon	2616.9	3.417783
Supplementary points.							
Long Rock, 1869	41 48 09.192	283.6	282 45 47.1	102 47 59.3	Sand	4695.0	3.671632
	124 17 47.627	1099.5	308 00 10.9	128 02 19.6	White	5223.3	3.717948
			319 23 50.7	139 25 43.1	Castle Rock	5984.4	3.777019
Southwest Seal Rock, point B, 1869	41 48 52.104	1607.5	284 30 54.5	104 35 17.3	Sand	9403.3	3.973280
	124 21 03.572	82.4	295 49 11.6	115 53 05.3	St. George	8992.7	3.953890
			304 50 58.2	124 55 01.1	Castle Rock	10261.4	4.011208
Whale Rock, 1869	41 47 40.854	1260.4	271 27 55.6	91 30 57.9	Sand	6319.2	3.800664
	124 19 02.909	67.2	287 57 51.5	108 00 24.7	St. George	5580.4	3.746662
			303 04 06.0	123 06 48.5	Castle Rock	6722.7	3.827542

Chetko River to Trinidad Head—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Azimuth.	Back azimuth.	To station.	Distance.	Logarithm.
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Star Rock, 1869	41 46 32.311	996.8	244 39 47.0	64 41 45.9	Sand	4560.2	3.658980
	124 17 27.814	642.4	262 48 57.6	82 50 27.4	St. George	3136.8	3.496489
			294 20 29.0	114 22 08.1	Castle Rock	3772.3	3.576611
Mussel Rock, 1869	41 48 14.706	453.7	282 37 26.7	102 40 02.2	Sand	5521.7	3.742076
	124 18 22.678	523.5	302 16 44.4	122 18 50.8	St. George	5179.7	3.714304
			315 03 14.3	135 05 30.0	Castle Rock	6659.3	3.823427
Southwest Seal Rock, point A, 1869	41 48 50.583	1560.6	284 15 13.8	104 19 36.3	Sand	9381.5	3.972273
	124 21 03.119	72.0	295 34 45.0	115 38 38.8	St. George	8962.9	3.952448
			297 28 44.6	117 32 53.7	White	9728.6	3.988050
Little Black Rock, 1869	41 50 14.271	440.3	293 43 08.4	113 48 29.7	Sand	12154.0	4.084720
	124 22 31.241	720.8	302 30 33.1	122 35 25.3	St. George	11999.9	4.079177
			308 47 23.2	128 52 24.6	Castle Rock	13402.2	4.127175
Flat Rock, 1869	41 47 56.630	1747.1	276 57 57.4	97 00 30.7	Sand	5352.5	3.728557
	124 18 19.419	448.3	297 09 51.0	117 11 55.2	St. George	4837.5	3.684620
			311 54 53.3	131 57 06.8	Castle Rock	6220.7	3.793841
Hump Rock, 1869	41 46 58.534	1805.9	257 02 06.3	77 04 29.5	Sand	5094.7	3.707115
	124 18 04.338	100.2	276 00 28.6	96 02 22.7	St. George	3977.5	3.599610
			298 54 12.1	118 56 15.5	Castle Rock	4889.8	3.689291
Small Rock, 1869	41 48 37.162	1146.5	292 17 36.8	112 19 50.6	Sand	5008.9	3.699738
	124 17 50.030	1154.8	313 39 32.2	133 41 16.9	St. George	5011.0	3.699922
			317 01 07.2	137 03 00.2	Point	5742.9	3.759129

For the convenience of the draftsmen of this office there are given the following unadjusted positions of stations, which are lost or for some other reason have no value except for the coordination of the old work:

TABLE OF POSITIONS OF LOST POINTS.

Coos Bay.

Station.	Latitude and longitude.	Seconds in meters.	Station.	Latitude and longitude.	Seconds in meters.
	° ′ ″			° ′ ″	
Woodland, 1861	43 23 58.71	1811.8	Isthmus, 1863	43 21 52.47	1619.3
	124 17 41.38	931.2		124 12 15.20	342.3
Trail, 1861	43 25 16.47	508.3	Kitchen, 1863	43 22 17.05	526.2
	124 17 36.47	820.4		124 10 55.11	1240.8
Wreck, 1861	43 23 55.09	1700.1	Marked tree No. 1, 1863	43 24 08.58	264.8
	124 18 24.94	561.3		124 17 09.10	204.8
Yokam, 1861	43 20 38.95	1202.0	Marked tree No. 2, 1862	43 24 18.93	584.2
	124 21 35.37	796.7		124 15 52.74	1186.7
Beach, 1861	43 23 20.65	637.3	Marked tree No. 3, 1862	43 25 29.83	920.9
	124 13 11.03	248.3		124 15 56.59	1273.0
Beaver, 1862	43 24 26.69	823.7	Marked tree No. 4, 1862	43 24 58.72	1812.1
	124 14 06.03	135.7		124 15 12.52	281.7
North Bend, 1862	43 25 14.55	449.2	Marked tree No. 5, 1862	43 25 39.63	1223.0
	124 13 03.45	77.6		124 15 18.64	419.3
Bight, 1862	43 25 47.72	1472.7	Marked tree No. 6, 1862	43 24 04.51	139.2
	124 15 04.70	105.7		124 13 56.21	1264.9
Bluff, 1862	43 24 40.58	1252.3	Marked tree No. 7, 1862	43 27 02.63	81.1
	124 11 45.49	1023.5		124 13 27.89	627.1
Coal Bank, 1863	43 21 34.75	1072.8	North Sands, 1861	43 21 45.18	1394.3
	124 12 25.04	563.9		124 19 17.71	398.8
Cooper, 1862	43 23 56.67	1748.9	Alder, 1861	43 22 40.70	1256.0
	124 13 06.34	142.7		124 17 19.87	447.3
Crawford, 1863	43 23 22.55	695.9	Charleston, 1861	43 20 49.34	1522.
	124 11 10.60	238.6		124 19 40.28	907.2
Hulet, 1863	43 22 51.58	1591.8	Coos Head, 1861	43 21 04.55	140.4
	124 13 13.07	294.2		124 20 12.47	280.8
Island, 1863	43 22 48.58	1499.2	Dennis, 1861	43 23 00.79	24.4
	124 10 25.09	564.8		124 18 58.55	1317.9

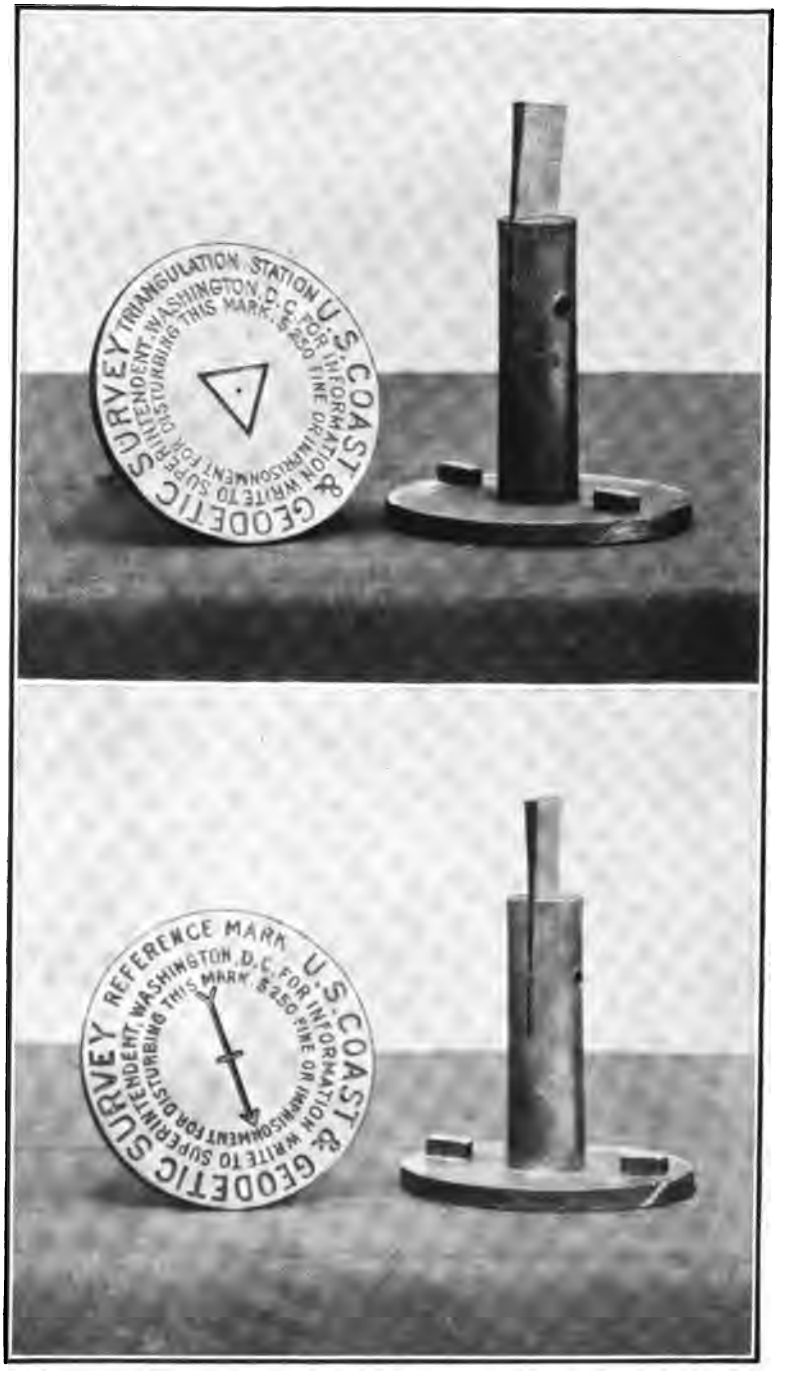
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FIG. 3.—STANDARD TRIANGULATION STATION AND REFERENCE MARKS.

Coos Bay—Continued.

Station.	Latitude and longitude.	Seconds in meters.	Station.	Latitude and longitude.	Seconds in meters.
	° ′ ″			° ′ ″	
Duke, 1861	43 22 15.31	472.5	Marked tree No. 13, 1862	43 24 27.02	833.9
	124 17 39.70	893.8		124 11 53.03	1193.2
Empire, 1861	43 23 44.60	1376.9	Marked tree No. 14, 1862	43 24 53.45	1649.5
	124 16 32.21	724.9		124 13 08.62	193.9
Fossil, 1861	43 21 29.54	911.6	Marked tree No. 15, 1863	43 23 48.26	1489.3
	124 18 38.14	858.9		124 11 14.26	320.9
Garden, 1861	43 24 07.59	234.2	Marked tree No. 16, 1862	43 24 35.99	1110.7
	124 17 33.71	758.6		124 13 21.69	488.0
Gregory, 1861	43 20 38.79	1197.1	Marked tree No. 17, 1863	43 22 52.54	1621.4
	124 22 32.97	742.6		124 10 16.66	375.0
Dash, 1861	43 24 27.46	847.4	Marked tree No. 22, 1863	43 22 16.90	521.5
	124 18 05.59	125.8		124 12 40.37	908.9
Johnson, 1861	43 20 32.63	1007.0	Marked tree No. 24, 1863	43 21 59.89	1848.2
	124 19 20.34	458.2		124 10 41.96	944.8
Kenny, 1861	43 23 39.26	1211.6	Mound, 1862	43 24 27.02	833.9
	124 18 06.39	143.8		124 13 44.28	996.3
Lodge, 1861	43 23 01.95	60.2	Pine, 1862	43 26 46.53	1435.0
	124 17 00.30	6.8		124 13 58.50	1315.5
Marked tree A, 1861	43 23 02.45	75.6	Reed, 1863	43 21 57.24	1766.5
	124 18 19.42	437.1		124 12 42.59	959.0
Marked tree B, 1861	43 20 59.22	1827.6	Relief, 1862	43 24 46.91	1447.7
	124 19 45.65	1028.1		124 13 41.50	933.7
Marked tree Anderson, 1861	43 21 24.03	741.6	Slab, 1863	43 23 03.32	102.5
	124 18 43.26	974.2		124 10 33.77	760.1
Marked tree Mosman, 1861	43 21 11.83	365.1	Woodland 2, 1862	43 23 59.03	1821.7
	124 18 49.15	1106.9		124 17 41.35	930.5
Martin, 1861	43 22 55.49	1712.5	Mill, 1889	43 21 11.91	367.6
	124 18 42.21	950.2		124 11 38.22	860.7
Pigeon astronomic, 1861	43 21 41.64	1285.0	Hardy's wharf	43 25 13.86	427.7
	124 18 14.64	329.7		124 12 00.24	5.4
Sallal, 1861	43 20 50.07	1545.2	Fridlund	43 24 57.78	1783.1
	124 18 55.31	1245.7		124 11 34.84	783.8
Siwash, 1861	43 20 22.02	679.6	Hagglund	43 23 57.43	1772.3
	124 19 07.45	167.8		124 11 28.77	647.4
Skiff, 1861	43 22 19.48	601.2	Hay Barn	43 25 20.98	647.5
	124 19 18.05	406.4		124 13 09.82	220.9
Whitewashed cliff, 1861	43 19 45.63	1408.2	Ross	43 21 10.35	319.4
	124 19 25.69	578.8		124 10 16.47	370.9
Whitewashed sapling, 1861	43 19 51.19	1579.8	Isthmus tree	43 21 56.22	1735.0
	124 19 09.17	206.6		124 11 37.54	845.3
Marshfield, 1863	43 22 30.26	933.8	Yokam 2	43 20 37.72	1164.1
	124 12 44.31	997.5		124 21 33.35	751.2
White, 1863	43 22 12.37	381.7	Empire Mill	43 23 49.35	1523.0
	124 11 53.65	1207.9		124 16 33.91	763.1
Merchant, 1862	43 25 06.86	211.7	Bay	43 23 52.39	1616.8
	124 13 05.09	114.5		124 17 21.64	487.0
Marked tree No. 8, 1862	43 24 39.34	1214.1	Timber Knob	43 24 05.48	169.1
	124 13 41.85	941.6		124 17 49.88	1122.5
Marked tree No. 10, 1862	43 24 54.05	1668.0	Coalbank tree	43 19 21.60	666.6
	124 13 33.51	753.9		124 17 17.86	402.4
Marked tree No. 11, 1862	43 25 55.26	1705.4	Snag	43 24 12.89	397.8
	124 12 26.27	590.9		124 12 38.04	856.0
Marked tree No. 12, 1864	43 25 18.73	578.0			
	124 13 06.73	151.4			

Tillamook Bay.

Station.	Latitude and longitude.	Seconds in meters.	Station.	Latitude and longitude.	Seconds in meters.
	° ′ ″			° ′ ″	
Marked tree No. 1, 1866	45 31 02.04	63.0	Pole No. 4, 1866	45 32 28.66	884.8
	123 53 11.38	247.0		123 56 16.83	365.1
Marked tree No. 2, 1866	45 33 31.18	962.6	Beach, 1875	45 37 13.94	430.4
	123 55 38.78	841.1		123 56 39.84	863.1
Marked tree No. 3, 1866	45 33 39.81	1229.0	Rock off Cape Mears	45 29 46.51	1435.9
	123 55 57.65	1250.3		123 59 01.74	37.8
Marked tree No. 4, 1866	45 34 08.33	257.2	Morgan's dwelling	45 30 11.21	346.1
	123 56 35.83	777.0		123 52 23.59	512.1
Pine, 1866	45 34 22.04	680.4	House No. 1, south gable	45 29 09.59	296.1
	123 56 52.65	1141.6		123 51 33.89	736.1
Pole No. 1, 1866	45 30 14.07	434.4	House No. 4, east gable	45 28 09.21	284.3
	123 53 51.55	1119.1		123 53 11.73	254.8
Pole No. 2, 1866	45 30 45.06	1391.1	House No. 5, north gable	45 28 22.87	706.1
	123 54 12.41	209.4		123 53 37.38	812.0
Pole No. 3, 1866	45 31 30.29	935.1			
	123 54 29.53	640.8			

Columbia River.

Marked tree, Government Island, 1899	45 34 49.68	1533.9	Deer Island, 1878	45 57 40.78	1259.1
	122 29 38.53	835.3		122 49 14.49	312.0
Sandhill tree, 1889	45 33 01.98	61.1	Eversole, 1878	45 46 20.30	626.8
	122 20 50.12	1087.2		122 46 18.39	397.4
W. house, west gable, 1889	45 32 37.24	1149.8	Thicket, 1878	45 46 17.34	535.4
	122 24 27.01	585.9		122 45 40.35	871.9
Bakers Bay, 1851	46 16 29.69	916.7	Willow Bar, 1878	45 45 49.17	1518.1
	123 56 40.06	857.9		122 45 57.03	1232.3
Channel, 1851	46 13 13.49	416.5	Sauvies Island, 1878	45 49 55.56	1715.4
	123 37 12.66	271.3		122 47 45.59	982.2
Cliff Point, 1851	46 15 47.00	1451.1	Henrici, 1878	45 48 43.49	1342.7
	123 50 19.46	416.7		122 47 50.91	1099.1
Cross, priest's house, 1851	46 14 45.66	1409.7	Lancaster, 1878	45 51 15.36	474.2
	123 54 17.67	378.5		122 45 59.89	1292.2
Lewis and Clark River, 1851	46 09 31.97	987.1	Sandy Beach, 1878	45 47 24.63	760.4
	123 51 42.60	902.3		122 46 30.44	657.6
Marsh Point 1, 1851	46 09 54.00	1667.2	Wilkman, 1878	45 47 12.26	378.5
	123 52 36.91	791.8		122 47 11.58	250.1
Marsh Point 2, 1851	46 13 43.88	1354.8	Willows, 1878	45 58 49.46	1527.1
	123 34 23.09	494.8		122 50 44.68	959.6
Pillar Hill tree, 1851	46 16 05.73	176.9	Round Point, 1878	45 48 47.50	1466.5
	123 34 17.52	375.1		122 47 04.51	97.4
Rock Knoll, 1851	46 16 03.89	120.1	Martins Island, 1878	45 56 10.00	308.7
	123 40 06.10	130.6		122 47 58.41	1258.4
Skeppernawin Creek, 1851	46 10 26.22	809.5	Barn, north gable, 1881	45 41 15.36	474.2
	123 54 30.68	658.2		122 41 51.40	1112.3
Upper Astoria, 1851	46 11 34.87	1076.6	Beacon, 1881	45 38 32.01	988.3
	123 48 06.06	172.8		122 46 31.80	688.6
Youngs River, 1851	46 09 50.59	1562.0	Cupola, Vancouver, 1881	45 37 47.38	1462.8
	123 50 00.17	3.7		122 40 02.06	44.6
Westerly of two trees, 1872	46 16 33.11	1022.3	Dann, 1881	45 49 16.32	503.9
	123 21 15.68	335.7		122 50 53.57	1156.5
Dead tree, 1872	46 09 45.76	1412.8	Dann's house, north gable, 1881	45 49 13.21	407.9
	123 25 57.94	1243.0		122 50 51.14	1104.0
Kalama astronomic, 1872	46 00 25.78	795.9	Dillion's house, north gable, 1881	45 40 11.54	356.3
	122 50 26.44	569.0		122 45 35.10	759.8
Kalama azimuth, 1872	46 00 24.61	759.8	Shobert chimney, 1881	45 49 16.32	503.9
	122 50 36.97	795.5		122 44 33.82	730.2
Ahlee, 1878	45 59 49.03	1513.8	Stewart's house, south gable, 1881	45 47 50.09	1546.5
	122 50 30.91	665.1		122 51 51.59	1114.1
Bachelors Island, 1878	45 49 42.57	1314.3	Tree on Rocky Butte, 1881	45 32 47.28	1459.6
	122 47 08.96	193.4		122 33 53.93	1169.8

DESCRIPTION OF STATIONS.

This list may be conveniently consulted by reference to the illustrations at the end of this publication or to the index. All azimuths given in the descriptions are reckoned continuously from true south around by west to 360°, south being 0°, west 90°, north 180°, and east 270°. Where magnetic azimuths are given they are indicated as such.

In general, except where the contrary is specifically stated, the surface and underground mark are not in contact, so that a disturbance of the surface mark will not necessarily affect the underground mark. The underground mark should be resorted to only in cases where there is evidence that the surface mark has been disturbed.

The initials and dates given in each description immediately after the county refer to the date of the establishment of the station, the man by whom it was established, and the date when the station was last recovered.

Any person who finds that one of the stations herein described has been disturbed, or that the description no longer fits the facts, is requested to send such information to the Superintendent, Coast and Geodetic Survey, Washington, D. C.

MARKING OF STATIONS.

The standard disk station and reference marks referred to in the following descriptions and notes consist of a disk and shank of brass cast in one piece, as shown in illustration No. 3. The disk of the station mark is 90 mm. in diameter, with a hole at the center surrounded by a 20 mm. equilateral triangle, and has the following inscribed legend: "U. S. Coast and Geodetic Survey Triangulation Station. For information write to the Superintendent, Washington, D. C. $250 fine or imprisonment for disturbing this mark." The shank is 25 mm. in diameter and 80 mm. long, with a slit at the lower end into which a wedge is inserted so that when it is driven into a drill hole in the rock it will bulge at the bottom and hold the mark firmly in place.

The standard disk reference mark, shown in illustration No. 3, is the same size and shape as the station mark, with an arrow on the top in place of the triangle, which, when properly set, points to the station. The legend is the same, except the words "reference mark" take the place of the words "triangulation station."

The type of station mark approved by the Chief of Engineers, United States Army, for re-marking stations originally established by that service is the same as the standard disk station mark, with the addition of a fourth and inner circle of lettering to the legend. This addition is "Estab'd by Corps of Engineers, U. S. A."

GENERAL NOTES REGARDING THE MARKING OF STATIONS.

Note 1.—This station is marked by an iron pipe 3 feet long set in a pier of concrete which is about 1 foot square at the surface of the ground and approximately 8 inches deep. The pipe projects from 4 to 8 inches above the cement. The top of the pier bears the inscription "U. S. E." and the name or an abbreviation of the name of the station. There is no underground mark.

Note 2.—This station is marked by a standard disk station mark set in an irregular pier of concrete, the top of which is spherical in shape and projects from 6 to 8 inches above the surface of the ground. The underground mark is a glass bottle set neck down in concrete from 2½ to 3 feet below the surface.

Note 3.—The geographic positions of the permanent reference marks at this station have been computed and may be found in the list of geographic positions immediately following the position of the station, consequently the distances and azimuths have not been repeated in the descriptions.

Note 4.—The same as note 1 with the addition that the iron pipe is filled with sand to the bottom of the concrete, and then with concrete to the top of the pipe, and a standard disk station mark of the type approved by the Chief of Engineers, United States Army, is set in the cement on the inside of the pipe.

Note 5.—The same as note 2 except that the standard disk station mark is replaced by a standard disk reference mark, and there is no underground mark.

Note 6.—The station is marked by a standard disk station mark set in an irregular pier of concrete, projecting from 6 to 8 inches above the surface of the ground. An iron pipe extends downward from under the station mark to a point just over the underground mark. The underground mark is a bottle set neck down in concrete 2½ or 3 feet below the surface.

Note 7.—The same as note 6 except that a standard disk reference mark replaces the station mark.

Note 8.—The station is marked by a bottle buried mouth up 3 feet below the surface and at the surface there is a rock with a drill hole filled with lead. Around the station, buried 1 foot, are three bottles distant about 6 feet, at equal angles, and lying on their sides with the necks pointing to the station.

Note 9.—The station is marked about 2½ feet underground by a bottle and at the surface by a drill hole, filled with lead, in a stone block. Three stakes around the station bear north, south, and east magnetic and are distant 0.91 meter.

Note 10.—The station is marked by a drill hole in a stone set firmly in the ground. Two stakes were set in line one on either side of the station, and a third stake was set at right angles to this line, each distant 1.22 meters.

Note 11.—The station is marked from 12 to 15 inches below the ground by a drill hole in a rock and at the surface by a standard disk station mark set in a rock. The reference marks are three-eighths-inch brass bolts set in a stone level with its surface.

Note 12.—The station is marked by a standard disk station mark cemented into a drill hole in an irregular shaped rock firmly set in place. The top of the stone is about 3 inches above the surface of the ground.

Note 13.—The station is marked by a bottle set 3 feet below the surface, and at the surface by a standard disk station mark set in a cylindrical bed of concrete 8 inches in diameter by 2 feet deep. There is a standard disk reference mark set in concrete.

Note 14.—The station is marked by a concrete block 10 inches square and 1½ feet deep with a 1½-inch iron pipe run through the center.

Note 15.—The station is marked by a bottle buried 3 feet below the surface, and at the surface there are three stubs with a copper tack in the top of each, distant 3 feet and bearing north, south, and east (magnetic).

Note 16.—Stations with a reference to this note were established by the United States Engineers and are marked in a temporary manner, usually by tacks or nails driven in wharves. There is no description for them available.

Note 17.—The station is marked by a pipe set in the center of a square block of concrete. The top of the concrete is smoothed off and bears the letters U. S. E., one letter in each of three corners. In the fourth corner is the number, letter, or name by which the station is known.

MOUTH OF THE COLUMBIA RIVER TO PORTLAND.

PRINCIPAL POINTS.

Scarboro Hill 2 (Pacific County, Wash., J. J. G., 1873; 1913). On the highest part of the hill entirely clear of timber and about 15 meters from the highest point on a line to Fort Stevens. The station is marked by a one-half-inch drill hole 2 inches deep in a stone buried 1 foot below the surface. South of the station 45 meters is a spruce tree 2 feet in diameter, marked with a blaze and three nails in the form of a triangle, north 29 meters is a spruce tree 20 inches in diameter with a similar marking, and west 53 meters is an alder tree 20 inches in diameter with the same marking.

East Battery (Pacific County, Wash., E. H. P., 1911; 1913). On the embankment of the old east battery at Forth Canby, on the brow of a steep slope which rises from the water at the easternmost point, abreast of Sand Island, 50 meters up the hill from the building on the slope, and 4 miles by road or 2 miles by water from Ilwaco, marked with a standard disk station mark set in the top of a square granite post, flush with the top of the ground. Reference mark No. 1 is a 3-inch iron bolt embedded in masonry about 1 foot above the level of the road, distant 9.42 meters in azimuth 45° 23′, reference mark No. 2 is the same as above and is distant 4.71 meters in azimuth 63° 09′, reference mark No. 3 is the same and is distant 6.54 meters in azimuth 120° 25′, reference mark No. 4 is the easternmost corner of cement manhole about 3 meters outside the embankment, distant 4.89 meters in azimuth 223° 09′.

Battery (Pacific County, Wash., J. J. G., 1873; 1909). The station is marked 1 foot below the surface by a one-half inch drill hole 2 inches deep in the top of a large stone. The station could not be recovered in 1911.

Fort Stevens Longitude (Clatsop County, C. V. H., 1911; 1913). On the embankment at the edge of the old moat, just in front of Battery Freeman at Fort Stevens. The station is marked by a standard disk station mark bearing the usual inscription and the words "Astronomical Station," set in the middle of the notch in the top of the pier. The foundation of the pier was placed 4 feet in the ground, the lower 2 feet being old concrete blocks tamped in with sand, the remainder is concrete. *Gun* is distant 27.90 meters in azimuth 45° 18′ 20″. Reference mark No. 1 is a cross one-half inch deep in the concrete embankment in front of the easternmost and smallest cannon in Battery Freeman and about 8 inches from the inner edge of the concrete, distant 37.25 meters S. 27° 30′ E. (magnetic). Reference mark No. 2 is a small triangle with a three-fourths inch hole in the center, cut in the concrete directly in front of the easternmost of the two 6-inch guns about 8 inches from the inner edge of the concrete, distant 42.20 meters S. 40° 00′ W. (magnetic.)

Island (U. S. E.) (Pacific County, Wash., E. B. L., 1913). On the southeast end of Sand Island, marked according to note 1.[1] The reference mark is a standard disk reference mark set in an irregular pier of concrete projecting 6 inches above the ground, distant 51.22 meters in azimuth 44° 03′ 12″.

Tansy Point 2 (Clatsop County, J. J. G., 1873). The station is marked 1 foot below the surface by a block of wood 1 foot square by 8 inches deep, with a one-half inch drill hole 2 inches deep in the top. On the surface there are three stubs, two parallel with the shore and one at right angles, each distant 1.83 meters.

Smith Point (Clatsop County, R. D. C., 1851; 1873). On Youngs Point, about 4.5 meters from the high-water mark and 5 feet above the tide. The station is marked by cross lines on a flat stone. There are three stakes around the station, each distant 1.83 meters.

[1] See p. 81.

Scarboro Hill (Pacific County, Wash., R. D. C., 1851; 1873). On the south side of Scarboro Hill, about one-half mile south of Chinook Point, and about 2 meters north of a remarkable ledge of rock cropping out of the side hill. The station is marked according to note 8,[1] except there is no surface mark.

Tansy Point (Clatsop County, R. D. C., 1851).—Lost.

Point Adams (Clatsop County, R. D. C., 1851). About one-half mile east of the extremity of Point Adams, on the edge of the bank 12 feet above the high-water mark. The station is marked according to note 8,[1] except there is no surface mark.

Cape Disappointment (Pacific County, Wash., R. D. C., 1851). On the side hill on the most eastern spur of Cape Disappointment. The station is marked by a stake driven 3 feet in the broken rock; around this are three other stakes, each distant 1.83 meters.

Baker east base (Pacific County, Wash., R. D. C., 1851). On Bakers Bay about 365 meters west of the mouth of the Chinook River, on a small sand hill about 10 feet above the ordinary high-water mark. The station is marked 3 feet below the surface by a copper bolt set in a sandstone block 10 inches square by 18 inches long; over this is a wood block 2 feet in diameter and 2½ feet long. Three stakes set around the station are distant 1.83 meters.

Baker west base (Pacific County, Wash., R. D. C., 1851). On Bakers Bay, 365 meters east of the mouth of the Wallicut River, about midway between the alder bushes and the high-water mark. The station is marked by a copper bolt in a sandstone block 10 inches square and 18 inches long set 3 feet below the surface; over this is a block of wood 2 feet in diameter and 2½ feet long. Three stakes were set, each distant 1.83 meters.

Point Ellice (Pacific County, Wash., R. D. C., 1851). On Point Ellice 25 feet above the tide. The bank was cut away and leveled to make room to occupy the station. The station is marked by a cross cut on a large flat rock. There are three stakes around the station, two distant 1.83 meters, and the other is north 1.22 meters.

Astor Point (Clatsop County, R. D. C., 1851). On Astor Point about 2 meters from the edge of the river and 7 feet above the high-water mark. The station is marked by a cross on a flat stone 3 feet below the surface. There are three stakes around the station, each 1.83 meters distant.

Grays Point (Pacific County, Wash., R. D. C., 1851). On the river bank about midway of Grays Point and 10 feet above the highest tide. The station is marked by a bottle buried 3 feet below the surface. There are 3 stubs with a copper tack in the top, each distant 1.83 meters.

Tongue Point (Clatsop County, R. D. C., 1851).—Lost.

Rocky Point (Wahkiakum County, Wash., R. D. C., 1851).—Lost.

Indian Point (Clatsop County, R. D. C., 1852). On Indian Point on a side hill about 20 feet above the tide, in front of an almost perpendicular cliff. The station is marked according to note 8,[1] except there is no surface mark.

Cathlamet Point (Clatsop County, R. D. C., 1851; 1871). On a side hill on the west side of Cathlamet Point, about 190 feet above tidewater. The station is marked by a bottle buried 3 feet below the surface. There are 3 stubs with copper tacks in the top of each, distant 1.83 meters from the station.

Jim Crow Point (Wahkiakum County, Wash., R. D. C., 1851; 1913). On the north side of the Columbia River, on Jim Crow Point, and about 1,800 meters to the east of Pillar Rock, and about 35 feet above the tide. The station is marked according to note 2,[1] with the exception that the underground mark is a stone, with a cross cut in its surface, buried 3 feet below the surface. See also the description of *Jim Crow Point* (*U. S. E.*).

Three Tree Point (Wahkiakum County, Wash., R. D. C., 1851; 1913). On the north side of the Columbia River, on Three Tree Point, about 35 feet above tidewater. The station is marked according to note 2,[1] except that the underground mark is a cross cut on a flat stone instead of a bottle. See description of *Three Tree Point* (*U. S. E.*).

Aldrich (Clatsop County, C. R., 1871). On the eastern end of a small sharp ridge on the northeast side of Cathlamet Point, 233 feet above tidewater. The station is marked according to note 8.[1] Three stakes were set as follows, north 1.46 meters, east 1.89 meters, and south 1.83 meters. There is a copper tack in a stump, distant 3.20 meters.

Skumaquea (Wahkiakum County, Wash., C. R., 1871.). On a high ridge nearly destitute of trees and covered with ferns, 342 feet above the tide. The station is marked according to note 8.[1]

Quinn (Clatsop County, C. R., 1871). On the side of the first point above Aldrich's fishery, opposite the lower part of Tenasillihee Island, near the shore, west of a deep ravine, and 153 feet above the river. The station is marked according to note 8.[1] Three stakes were set in the ground, north, south, and east, respectively, each distant 1.83 meters.

Lokamin (Wahkiakum County, Wash., C. R., 1871). On the end of the most prominent projecting ridge between Skumaquea and Cathlamet. The station is marked according to note 8.[1] Three stakes around the station are distant 1.83 meters, bearing magnetic, respectively, north, south, and east.

Hunts Mill Point (Clatsop County, C. R., 1871). On the apex of a ridge of basaltic rock which is nearly perpendicular on the river side. The station is marked according to note 8.[1] There are three stakes around the station, distant 1.83 meters and bearing magnetic east, west, and south.

Birnie (Wahkiakum County, Wash., C. R., 1871). On the cleared land near the edge of the timber, about 275 meters southeast of the Birnie house, just south of a road and 156 feet above the river. The station is marked according to note 8.[1] Three stakes bearing north, south, and east are distant 1.83 meters.

Westport (Clatsop County, C. R., 1871). On a sharp ridge projecting into the bottom lands, 600 meters from the wharf and 292 feet above the level of the river. The station is marked according to note 8,[1] except the surface mark was omitted. Three stakes around the station are distant 1.83 meters, bearing, respectively, north, south, and east.

[1] See pp. 81 and 82.

Anderson (Wahkiakum County, Wash., C. R., 1872). About 3½ miles above Cathlamet, on a rocky side hill covered with heavy timber and brush, nearly opposite the head of Puget Island, and about 150 feet above the level of the river and about 3 meters east of an old burnt stump. The station is marked according to note 9,[1] except the surface mark is omitted and the three stakes are each 1.83 meters distant.

Woods (Columbia County, C. R., 1873). About 4½ miles above Westport, up the Westport Slough, on the apex of a sharp ridge on land owned by Mr. Woods. The station is marked according to note 8,[1] except the surface mark is a piece of the original signal pole.

Cape Horn (Wahkiakum County, Wash., C. R., 1873).—Just back of a large rock on a point locally known as Cape Horn. The station is marked according to note 8,[1] except there is no surface mark. There are 2 stubs and a stump of a tree with copper tacks in them, distant 1.83 meters from the station.

Clatskanie (Columbia County, C. R., 1873).—On a sharp ridge opposite the head of Westport Slough where it branches off from Beaver Slough, 227 feet above the river level. The locality can be located by the lines of stumps left by the cutting which was done to open lines of sight. The station is marked according to note 8,[1] except the surface mark is a part of the center pole of the original signal.

Cooper (Wahkiakum County, Wash., C. R., 1873). On the north side of the Columbia River on a sharp ridge above a rocky point, 91 feet above the river. The station is marked according to note 8,[1] except the surface mark is a section of the original center pole of the signal. Three stakes were set bearing north, south, and east magnetic distant 1.83 meters.

Bradbury (Columbia County, C. R., 1873). On land owned by Mr. Bradbury about 150 meters from the prairie, 80 meters from the edge of a clearing, 71 feet above the level of the river. The station is marked according to note 8,[1] except the surface mark is a section of the old center pole of the signal. Three stakes bear north, south, and east magnetic distant 1.83 meters.

Abernathy (Cowlitz County, Wash., C. R., 1873). On the summit of the high perpendicular basaltic cliffs, about 15 meters from the edge, and 291 feet above the river level, and just east of the first break in the cliff below Oak Point Creek. The station is marked according to note 8,[1] except there is no surface mark. Three stakes around the station bear north, south, and east magnetic distant 1.83 meters.

Nequally (Cowlitz County, Wash., C. R., 1873). About one-half mile below the mouth of the Nequally Creek, on the brink of a precipice of basaltic rock, 268 feet above the level of the river. The station is marked according to note 8,[1] except the surface mark is a section of the center pole of the old signal. Three stakes bear north, south, and east magnetic distant 1.83 meters.

Stoughton (Columbia County, C. R., 1873). About 1½ miles above Oak Point on what is called Bradburys Slough, in a small garden 3 or 4 feet above high water, and 30 meters from the shore and 80 meters east of the house. The station is marked according to note 8,[1] except the surface mark is a section of the center pole of the old signal. Three stakes bear north, south, and east magnetic distant 1.83 meters.

Greens Point (Columbia County, C. R., 1873; 1885). On a bold, rocky point about 4 miles above Oak Point and about 75 feet above tidewater. The station is marked according to note 8,[1] except the surface mark is a piece of pine 4 inches square. There is a pine stub east and one south of the station 1.83 meters.

Coal Creek Ridge (Cowlitz County, Wash., A. W. C., 1873). On the edge of a prominent ridge about one-half mile west of Coal Creek; the numerous stumps left from the heavy cutting will serve to identify the locality. The station is marked according to note 8.[1]

Mount Solo (Cowlitz County, Wash., C. R., 1873). On a narrow ridge of land on the western side of Mount Solo. The locality can probably be found by the heavy cutting which was done to open lines of sight. The station is marked according to note 8,[1] except the surface mark is a section of the center pole of the signal. Three stakes around the station have the following magnetic bearings and distances: North 1.83 meters, south 1.83 meters, and west 1.87 meters.

Rinearson (Columbia County, C. R., 1873; 1913). On the summit of a very sharp pointed hill, over the east one of two tunnels, west of camp No. 1, Peninsula Lumber Co. The station is marked according to note 2,[1] except that a small hole in the concrete replaces the bottle in the underground mark.

Huntington (Cowlitz County, Wash., C. R., 1873; 1913). About 2 miles west of Kelso, on the western side of a large, isolated bowlder. The station is marked by a standard disk station mark set in lime mortar. The underground mark is a flat stone with a cross cut on it buried 2 feet below the surface. Three bottles were placed on their sides with the necks pointing to the station and buried 1 foot. There is a triangular blaze on the side of an oak tree facing the station distant 3.82 meters and a similar mark on a spruce tree distant 15.70 meters.

Rainier (Columbia County, C. R., 1873). Near the village of Rainier, on a side hill about 200 meters from the shore and down the hill about 45 meters from an old logging road. The station is marked according to note 8,[1] except that the surface mark is a post 2½ feet long with a copper tack in the top. There is a blazed fir tree stump bearing 206° magnetic distant 3.64 meters and a blazed fir tree bearing 37° magnetic distant 2.59 meters.

Coweman (Cowlitz County, Wash., C. R., 1873).—Nearly opposite the mouth of the Coweman Creek, on top of a small ridge, back of which the ground falls before rising to the hills, about 60 meters from the lowlands, and 167 feet above the river. The station is marked according to note 8,[1] except the surface mark is a section of the old center pole of the signal. Two stakes were set, one east and one west of the station.

Mount Coffin (Cowlitz County, Wash., C. R., 1873; 1913). On the summit of a rock called Mount Coffin, about 4.5 meters from the northern edge of the rock, which is nearly vertical on that side, and 227 feet above tidewater. The

[1] See pp. 81 and 82.

station is marked by a drill hole filled with lead in a rock level with the surface of the ground. The reference mark is described in note 5.[1] There is a triangular blaze on an oak tree distant 23.3 meters in azimuth 90° 25′, and a similar blaze on a large spruce tree distant 9.83 meters in azimuth 110° 46′. See note 3.[1]

Warren (Columbia County, C. R., 1873). About 1 mile above Rainier, on top of a steep bluff about 100 meters from the river and 142 feet above tidewater. The station is marked according to note 8,[1] except there is no surface mark. Three stakes were set with the following magnetic bearings and distances: North 1.83 meters, east 1.80 meters, and south 1.83 meters.

Carolls Point (Cowlitz County, Wash., C. R., 1873). On top of an isolated ridge exactly opposite the head of Cottonwood Island. The station is marked according to note 8,[1] except there is no surface mark.

Galloway (Columbia County, C. R., 1873). Opposite the upper part of Cottonwood Island, 6 or 7 meters from the edge of the precipice, almost immediately over the water. The station is marked according to note 8,[1] except the center mark is a section of the center pole of the old signal. Three stakes were set bearing magnetic north, south, and east distant 1.83 meters.

Carr (Columbia County, C. R., 1873; 1913). About one-half mile up the river from Prescott, on a rocky point approximately 50 feet above low water. The station is marked by a stone sunk in the ground, the top being flush with the surface. There is a hole drilled in the stone, filled with lead and marked with cross lines. The reference mark is according to note 5.[1] There is a blaze with copper tacks on a fir tree distant 35 meters in azimuth 34° 07′ 36″. See note 3.[1]

Drays Mound (Cowlitz County, Wash., C. R., 1873; 1913). About 2¼ miles northwesterly from Kalama, near the tracks of the Northern Pacific Railway and on the southern end and highest part of Drays Mound. The station is marked according to note 2,[1] with the exception that the underground mark is an iron nail set in cement in a hole drilled in the rock; also 1 foot below the ground there are two bottles on their side and with the necks pointing to the station. The reference mark is a galvanized-iron pipe filled with earth and cement, and set in concrete, with a copper tack in its top surface. There is a triangle on a fir tree distant 6.43 meters in azimuth 120° magnetic. See note 3.[1]

Gobles Point (Columbia County, C. R., 1873). About 1 mile below Kalama on broken rocky ground, about 100 meters from the shore. The station is marked according to note 8,[1] except the surface mark is a post 2½ feet long, with a copper tack to mark the station.

Rocky Ridge (Cowlitz County, Wash., C. R., 1878). On a rocky ridge about 180 meters from the shore back of a small log cabin. On the north side of the ridge is a heavily wooded swamp. The station is marked according to note 8.[1] There is a triangular blaze on a small fir stump bearing N. 85° E. magnetic, distant 10.13 meters, and a fir tree with a similar mark bears S. 80° E. magnetic, distant 15.12 meters.

Hunter (Columbia County, C. R., 1873). Nearly opposite Kalama, on firm bottom land 25 meters from the shore, 75 meters from an orchard back of the station, 120 meters north of a house, and 225 meters north of a creek. The station is marked according to note 8,[1] except the surface mark is a section of the center pole of the original signal. Three stakes bear magnetic north, south, and east distant 1.83 meters.

Hoffman (Cowlitz County, Wash., C. R., 1878). About 3 miles above Kalama, 1 mile below Martins Bluff, 180 meters above Mr. Hoffman's house, and 75 feet above the level of the river, and 12 or 14 meters from the edge of the bank. The station is marked underground by a drill hole in a rock filled with lead. There are three wild cherry stakes set as follows: North 1.83 meters, south 1.87 meters, and east 1.81 meters.

Martins Bluff (Cowlitz County, Wash., C. R., 1878; 1913). The station is 4 meters from the edge of the summit of Martins Bluff, approximately 75 feet above low water. The station is marked by a copper bolt in rock. The reference mark is the same as is described in note 7,[1] except no underground mark. There is a triangle blazed on the only large fir tree in the vicinity distant 22.98 meters in azimuth 291° 59′. See note 3.[1]

Merrill (Columbia County, C. R., 1878). On the nose of a high ridge on the farm belonging to Mr. Norton Merrill and southwest of the bridge across Tide Creek. The station is marked by a drill hole filled with lead in a large conical rock. Three cedar stakes were set as follows: North 1.79 meters, south 1.83 meters, and east 1.86 meters. Three copper tacks in a triangular blaze on a white fir tree bear S. 73° W., magnetic, distant 9.769 meters.

Burnt Hill (Cowlitz County, Wash., C. R., 1878). On the crest of a burnt ridge covered with scrub oak and hazel, with a few trees in the vicinity. The station is marked according to note 8,[1] except the three bottles pointing to the station are omitted. There are three cedar stakes around the station, as follows: North 1.74 meters, south and east each 1.79 meters.

Maple Hill (Columbia County, C. R., 1878). About 1½ miles below Columbia City, nearly opposite the head of Deer Island, on the summit of a wooded hill about 460 feet above the river level. The station is marked 2½ feet underground by a drill hole filled with lead in a flat-topped stone, and at the surface by a similar mark in a stone projecting 6 inches above the surface. Three cedar stakes were set as follows: North 1.79 meters, south and east each 1.83 meters. There are three copper tacks in a triangular blaze on a fir tree bearing S. 15° W. magnetic, distant 2.35 meters.

Lewis River Hills (Clarke County, Wash., C. R., 1878). On a narrow bench on one of the most prominent ridges on the southwest face of the hills lying between the two forks of the Lewis River. The station is marked according to note 8.[1] Three cedar stubbs are set as follows: North 1.81 meters, east 1.83 meters, and south 1.86 meters. Three copper tacks in a blaze on a burnt stump bear S. 6° E. magnetic, distant 3.472 meters.

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[1] See pp. 81 and 82.

Reed (Clarke County, Wash., C. R., 1878). About 135 meters northwest of the top of the hill on the land owned by Mr. S. G. Reed. The station is marked according to note 8.[1] Three stakes are set around the station as follows: North 1.83 meters, east 1.84 meters, and south 1.85 meters.

Table Cliff (Columbia County, C. R., 1878). On a bare flat table cliff of rock about midway between Columbia City and St. Helens, about one-half mile from the river shore, and 275 meters from the county road from St. Helens to Portland, and about 200 feet above the river level, northeast of a small gulch, and about 27 meters southeast of a small pond in the rainy season. The station is marked by a drill hole filled with lead in solid rock.

Scappoose (Columbia County, C. R., 1878; 1881). On the end of the high ridge between the north and south forks of the Scappoose Creek, and west of the county road between St. Helens and Portland, about 460 feet above the river. The station is marked according to note 8.[1] There are three cedar stubs around the station, as follows: East 1.92 meters, north 1.84 meters, and south 1.84 meters. Three copper tacks in a triangular blaze on a large fir stump bears S. 80° E. magnetic, distant 6.91 meters, and a similar mark on a large fir tree bears S. 12° E. magnetic, distant 5.34 meters.

Fales (Clarke County, Wash., C. R., 1878; 1881). In a cleared field on high ground on the east side of Lake River. The station is marked according to note 8.[1] Three cedar stakes are set as follows: North 1.79 meters, south 1.86 meters, and east 1.80 meters.

Secrist (Clarke County, Wash., C. R., 1881). On the north side of Vancouver Lake just back of Secrist Landing, on a bare hillside about 100 feet above the lake, 50 meters east of an old log house, and close to a fence which is parallel with the shore. The station is marked according to note 8,[1] except the underground mark is the intersection of cross lines on a flat stone. Three cedar stakes were set as follows: North 1.73 meters, south 1.84 meters, and east 1.81 meters.

Bouser (Multnomah County, C. R., 1878; 1881). On the west side of Willamette Slough, about 1 mile below Rocky Point, on the northeast end of a partly bare spur southwest of the Bouser farmhouse, and 515 feet above the water level. The station is marked according to note 8.[1] Three cedar stakes were set as follows: North 1.86 meters, east and south each 1.83 meters. Two fir trees have copper tacks in a triangular blaze; one bears S. 18° W. magnetic distant 8.50 meters and the other bears S. 55° W. magnetic distant 3.615 meters.

Willamet (Multnomah County, C. R., 1881). On the nose of a high hill on the west bank of the Willamette River, about 1 mile south of the head of Willamette Slough, on a level spot which can probably be easily found from the heavy cutting done to open lines of sight. The station is marked according to note 8.[1] There are three cedar stubs around the station, as follows: North 1.80 meters, east 1.79 meters, and south 1.78 meters. A triangular blaze on a fir stump bears N. 61° E. magnetic distant 5.03 meters, and a second similar mark bears N. 26° W. magnetic distant 5.67 meters.

Warren (Columbia County, O. B. F., 1903). About a mile southwest of Warren, a station on the Northern Pacific Railway, on a slight elevation or ridge near the west side of a pasture owned by Mr. E. Harnes, and about 250 meters north of an east-and-west road. The station is marked by a three-eighths inch copper bolt 3 inches long, cemented into a drill hole in a stone 6 by 12 by 18 inches, buried 18 inches below the ground. The surface mark is the old-style station mark, which is a disk and shank cast in one piece. The disk is about 85 millimeters in diameter and has a polished center surrounded by the raised letters "U. S. C. & G. S." and a raised flange around the edge. This mark is set at the surface of the ground in a bowlder 8 by 24 by 24 inches, with the letters "U. S." cut on the north side. There are three reference marks, which are drill holes in the top of three-eighths inch copper bolts, which are leaded or cemented into drill holes in rock with the top of the bolt flush with the surface. The three reference marks are in the north-and-south fence line to the west of the station. The middle mark of the three is 246.7 meters north of the north road fence and the other two are each about 30 meters distant from the middle mark, one north and the other south. They are at the following distances and azimuths from the station: 23.67 meters, 93° 15′; 37.46 meters, 41° 26′; and 37.95 meters, 142° 46′.

Rocky Butte (Multnomah County, C. R., 1889; 1903). On the north side of the highest part of the bush-covered summit of the butte, about 2 miles northeast of Montavilla. The station is marked by a drill hole in a large-topped bowlder.

Harney (Clarke County, Wash., C. R., 1881; 1903). On the north bank of the Columbia River, about 1½ miles above the United States wharf at Vancouver, on a sloping bare bluff immediately above the road leading from Vancouver up the river. It is almost in front of the Harney House, on land formerly owned by Gen. Harney, and about 80 meters east of the fence inclosing the race track. The underground mark consists of a glass bottle placed 3 feet below the surface, with the neck up, the center of the neck marking the station, and three other bottles placed on their sides at a depth of about 1 foot and at a distance of about 6 feet from the center, with the necks of the bottles pointing toward the center. The surface mark is a small drill hole 2 inches deep in a basaltic bowlder, weighing about 350 pounds, placed with its top flush with the surface of the ground. The following bearings to the right of the magnetic north were read at the station: East chimney of Harney House, 27° 05′; triangle on tree, 74° 28′; white house on south side of river, 172° 55′; ventilator on barn, 220° 06′; and corner of race-track fence, 276° 47′.

Barnes (Multnomah County, O. B. F., 1903). On a cleared hill about 4 miles west of Portland, between the Barnes and Cornell roads, and just east of the highest hill in this range, which hill is still densely wooded. It is on the south edge of the hill, about 100 feet southeast of a fir tree and some small maples, and close to the north side of a large stump.

[1] See pp. 81 and 82.

The station is marked by a three-eighths inch copper bolt 3 inches long, cemented into a drill hole in a stone 6 by 12 by 18 inches, 1½ feet below the surface. The surface mark is an old-style station mark, which is a disk and shank cast in one piece. The disk is about 85 millimeters in diameter and has a polished center surrounded by the raised letters "U. S. C. & G. S." and a raised flange around the edge. This is set in a stone 8 by 14 by 18 inches, with its top flush with the surface of the ground. The two reference marks are drill holes in the top of three-eighths inch copper bolts, which are leaded or cemented into drill holes in rock with the top of the bolt flush with the surface. These are set at the roots of stumps on the side facing the station and are located as follows: One in a bowlder 15 inches in diameter, distant 15.80 meters from the station in azimuth 156° 11′; and the other in a bowlder 12 inches in diameter, 7.02 meters from the station in azimuth 233° 23.′ A third reference mark consists of a cross in the top of a bowlder 10 inches in diameter buried 15 inches beneath the surface, and of a copper bolt directly above the cross in a bowlder 14 by 14 by 18 inches, set with its top flush with the surface of the ground. It is about 3 feet north of the main east-and-west fence line, about 30 feet east of where this fence crosses the highest part of the ridge, and about 3 feet east of a fence extending northward from this fence, and 44.95 meters from the station in azimuth 184° 35′.

Monument, General Land Survey (Multnomah County, O. B. F., 1903). The initial intersection of the first standard parallel and the Willamette meridian, a short distance southeast of Barnes. (See above.) The station is in a fence corner, and is marked by a stone post projecting 1½ feet above the ground.

River (Multnomah County, O. B. F., 1903). Near the junction of the two suburbs of Portland known as Arbor Lodge and Peninsula, on the east bank of the Willamette River about a mile east of Columbia University. It is on a slight elevation, the highest in the vicinity, and in the fence line on the north side of the boulevard along the river bank. It was placed as far east as possible and still keep the Oregonian Building in view. The station is marked by crosses cut in the tops of two bowlders, one placed near the surface of the ground and the other directly beneath at a depth of 1.7 feet, each stone bearing the letters "U. S. C. S." cut in the top.

Oregonian (Multnomah County, O. B. F., 1903). The tall iron pole at the southeast corner of the tower of the Oregonian Building, at the northwest corner of Sixth and Adler Streets, Portland.

Portland longitude station (Multnomah County, C. H. S., 1887; 1905). This station has been destroyed.

Portland latitude station (Multnomah County, C. H. S., 1887; 1905). This station has been destroyed.

Balch (Multnomah County, C. R., 1881; 1906). This station was occupied for azimuth in 1886. It is immediately northwest of the city limits of Portland, about a mile south of the Willamette River, on the first small level bench of the spur making out from the ridge west of the Cornell road, and about 255 feet above the road. The station is marked underground by a broken-necked bottle placed neck up 2 feet below the surface, and by a cross in the top of a copper bolt set in concrete 6 inches above the bottle, and at the surface by a cross on an old-type station mark set in concrete, which is inscribed with the letters "C. & G. S." The old-type station mark consists of a disk and shank made of brass and cast in one piece. The disk is about 85 mm. in diameter and has a polished center surrounded by the raised letters "U. S. C. & G. S." and a raised flange around the edge. The reference marks are the remains of two brick piers built in line to the west of the station, with their foundation about 20 inches below the surface, the nearest edge of the first pier being 1 meter west of the station.

Sands (Clatsop County, E. B. L., 1913). On the highest part of the sand spit near the middle of the river and 2½ miles northwest from Smith Point. The station is marked according to note 2. A pile marked with nails is distant 103.9 meters in azimuth 172° 18′ 40″.

Point Ellice (*U. S. E.*) (Pacific County, Wash., U. S. E., 1913). On Point Ellice between the river bank and the tracks of the Oregon-Washington Railroad & Navigation Co., and 25 feet above the low-water mark. There is a large bowlder within 1 meter of the station. The station is marked according to note 1.[1] Reference mark No. 1 is a cross cut in rock, the longer arm pointing toward the station. Reference mark No. 2 is a standard disk reference mark set in a block of concrete. See note 3.[1]

Harrington (*U. S. E.*) (Wahkiakum County, U. S. E., 1913). Located one-half mile west of Altoona Cannery, 12 meters from the edge of the bluff, and approximately 20 feet above the mean stage of the river. There is a sharp break in the bluff line 7 meters from the station on a line to Altoona Cannery. The station is marked according to note 1.[1] The reference mark is a hole bored in a bowlder on the shore.

Taylor (Clatsop County, E. B. L., 1913). On a fishing wharf on Taylor Sands. Marked with a triangle of copper tacks with one tack in the center.

Grays (*U. S. E.*) (Pacific County, Wash., U. S. E., 1913). One mile east of Knapton, one-half mile west of Gray's Point, 6 meters from the edge of the bluff, and 20 feet above the river at mean stage. The station is marked according to note 1.[1] There is a triangle blazed on a leaning spruce tree near the edge of the bluff, distant 11.6 meters in azimuth 51° 48′, a second spruce tree distant 13.9 meters in azimuth 87° 01′ is marked in a similar manner. There is a pile of stone 4 feet high distant 30 meters in azimuth 92° 01′.

Tongue (*U. S. E.*) (Clatsop County, U. S. E., 1913). On Tongue Point, on the bluff above the rock crusher and east of the trail from the rock crusher to the convict camp. The station is marked according to note 1.[1] The reference mark is described in note 7.[1] See note 3.[1]

Water (Clatsop County, E. B. L., 1913). There is no permanent mark for this station, owing to the high water. A pole was nailed to the roots of a stranded tree.

Rocky Point 2 (Wahkiakum County, Wash., E. B. L., 1913). On Elliott Point, one-fourth mile east of Elliott Landing, on a rocky point 6 meters from the edge of the bank, and 20 feet above the mean stage of the river. The station

[1] See pp. 81 and 82.

is marked according to note 2.[1] The reference mark is a galvanized-iron pipe filled with and set in concrete, with a copper tack in its top surface. There is a triangular blaze on a maple tree distant 30.82 meters in azimuth 112° 19′ 30″. See note 3.[1]

Wharf (Clatsop County, E. B. L., 1913). This station was on a wharf which was lost in July, 1913.

Jim Crow (*U. S. E.*) (Wahkiakum County, Wash., U. S. E., 1913). On Jim Crow Point, near the middle of a sharp ridge one-fourth mile southeast of Brookfield. The station is marked according to note 1.[1] There is a triangle blazed on a fir tree distant 5.13 meters. The relation of Jim Crow Point (U. S. E.) to Jim Crow Point is given in the list of positions.

Raspberry (*U. S. E.*) (Clatsop County, U. S. E., 1913). On a sidehill, one-fourth mile west of Cathlamet Point. The station is marked according to note 1.[1] There are no reference marks.

Three Tree Point (*U. S. E.*) (Wahkiakum County, Wash., U. S. E. 1913). On Three Tree Point, about 20 feet above the mean stage of the river. The station is marked according to note 1.[1] See the description of Three Tree Point.

Ten (Clatsop County, E. B. L., 1913). At the northeast end of Tenasillihee Island, on the northwest bank of Multnomot Slough. The station was a flag in a tree. The reference mark is the same as is described in note 5.[1] See note 3.[1]

Dike (Wahkiakum County, Wash., E. B. L., 1913). On Hunting Island, about 1½ miles northwest of Cathlamet, on a small dike, and about 4 feet above the high-water mark. The station is marked according to note 2.[1] The reference mark is the same as described in note 6.[1] There is a triangle blazed on a willow tree distant 23.8 meters in azimuth 315° 12′, also one on a large spruce tree near the river bank distant 65.15 meters in azimuth 330° 53′.

Mud (Clatsop County, E. B. L., 1913). On Tenasillihee Island, opposite Hunting Island light, about 1¼ miles northwest of Cathlamet, and below the high-water level of the river. The station is marked by a 1½-inch galvanized iron pipe, 5 feet long, and projecting 3 feet above the ground. The pipe is filled with cement, with a standard disk station mark set in the top.

Barlow (Cowlitz County, Wash., E. B. L., 1913). On Barlow Point, below the high-water stage of the river. The station is marked according to note 2,[1] except that the station mark is placed 1 foot below the surface of the ground. Reference mark No. 1 is the same as is described in note 7[1] and is 2 feet from the southeast corner of Barlow's dwelling. Reference mark No. 2 is described in note 5,[1] and is near the fence line at a large gate.

Quarry (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1913). On the southeast end of the wharf of the Star Sand Co., northwest of the ramp. The station is marked by a triangle of nails with one nail in the center. The following distances are given: Dolphin, 5.33 meters; edge of ramp, 0.82 meter; edge of wharf toward the river, 1.28 meters; and mooring pile, 0.54 meter.

Slaughter 2 (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912; 1913). On the wharf at Slaughter Landing, 1.28 meters from the edge of the wharf, 1.82 meters from the side of barn, and 4.26 meters up the river from an old mooring pile. The station is marked by a sixtypenny nail at the center of a cross of twentypenny nails, surrounded by a triangle cut in the plank. Reference mark No. 1 is described in note 7,[1] except there is no underground mark, and reference mark No. 2 is a 3-foot length of 1½-inch galvanized-iron pipe with a standard disk reference mark set in its top with cement. See note 3.[1]

Curve (*U. S. E.*) (Columbia County, U. S. E., 1912). On the south side of the tracks of the Spokane, Portland & Seattle Railway, near the middle of a curve, distant 1.52 meters from the south rail and 88.42 meters southeast from a road crossing the railroad. The station is marked according to note 1.[1]

Tangent (*U. S. E.*) (Columbia County, U. S. E., 1912). South of the tracks of the Spokane, Portland & Seattle Railway, 228.6 meters in a northwesterly direction from a telephone pole. The station is marked according to note 1.[1]

Beach 2 (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1913). The station is 7 meters outside the high-water line and is marked according to note 1.[1]

Bourne (*U. S. E.*) (Columbia County, U. S. E., 1912). South of the tracks of the Spokane, Portland & Seattle Railway, about midway between the track and the line of telephone poles, and 38.09 meters northwesterly of the road to the dock. The station is marked according to note 1.[1]

A 2 (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). Three meters from the river bank, near a sorting gap in a log boom. The following distances are given: To a triangle blazed on a cottonwood tree with a nail in the center, northerly 4.87 meters; to a triangle with a nail in the center, easterly 5.49 meters; and to a pump upstream, approximately east-southeast 42.54 meters. The station is marked according to note 1.[1]

Hut (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). The station is on a small knoll. The following distances are given: To a cottonwood tree, northwesterly 4.47 meters; to apple tree, easterly 4.66 meters; to northwest corner of old house, easterly 8.37 meters; and to a telephone pole, southwesterly 15.97 meters. The station is marked according to note 1.[1]

Mill (*U. S. E.*) (Columbia County, U. S. E., 1912). In the town of Rainier, near the Columbia Door Co.'s mill, on a side hill southwest of the tracks of the Spokane, Portland & Seattle Railway. The following distances are given: To the corner of wall, 6.03 meters southeasterly; to face of wall, 4.62 meters southerly; to corner of wall, southwesterly 5.41 meters; and to a flagpole, 14.69 meters. The station is marked according to note 1.[1]

Wood 2 (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). Upriver or southeasterly from a slough approximately 60 meters. The station is marked by a pipe set in a concrete monument buried 2 feet in the ground. The following distances are given: To a blazed cottonwood tree, northwesterly 8.93 meters; to a blazed cottonwood tree, north 9.60 meters; to a blazed cottonwood tree, southwesterly 18.44 meters.

[1] See pp. 81 and 82.

Dock (*U. S. E.*) (Columbia County, U. S. E., 1912). In the city of Rainier on the wharf of the Pacific National Lumber Co. The station is marked by a twentypenny nail surrounded by eightpenny nails driven at irregular intervals and a triangle cut in the plank. The following distances are given: To a mooring pile, westerly 0.76 meter; to the river edge of the wharf, northerly 0.45 meter; and to the west edge of log chute, easterly 8.44 meters.

Net 2 (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). Opposite Rainier and 0.6 meter west of the center line of the street on which the Rainier post office is located, 7.62 meters from the river bank. The station is marked according to note 1.[1]

Rainier 2 (*U. S. E.*) (Columbia County, U. S. E., 1912). In the city of Rainier, near the northwest corner of Water and Virginia Streets. The following distances are given: Eastern curb line of Virginia Street, easterly 7.62 meters; southwest corner of sheet iron building on the northeast corner of Virginia and Water Streets, easterly 14.53 meters; northwest corner of concrete block building on the northeast street corner, southeasterly 35.05 meters; cross on Water Street curb, southeasterly 5.03 meters; and cross on Water Street curb, southwesterly 4.61 meters. The station is marked according to note 1.[1]

Bluff (*U. S. E.*) (Columbia County, U. S. E., 1912). On a sharp rocky ridge south of the tracks of the Spokane, Portland & Seattle Railway. The station is marked according to note 1.[1]

Cowlitz 2 (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). At the junction of the Columbia and Cowlitz Rivers, outside the high-water line and south of the line of the jetty. The station is marked according to note 1.[1]

D 10 (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). Approximately 244 meters southeast of the northwestern end of Cottonwood Island and 9 meters inside the high-water line. The station is marked according to note 1.[1] The following distances are given: To a nail in a notched blaze in a cottonwood stump northerly 18.04 meters; to a nail in a triangle blazed on a forked ash northeasterly 20.7 meters; to the center of a small knoll southeast approximately 60 meters.

D 9 (*U. S. E.*) (Columbia County, U. S. E., 1912). On a sharp ridge between the tracks of the Spokane, Portland & Seattle Railway and the Columbia River. The station is marked according to note 1.[1]

D 8 (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). About midway of the western shore of Cottonwood Island and 30 meters inshore from the high-water line. The station is marked according to note 1.[1] The following distances are given: To Cottonwood Island upper range rear light westerly 38.31 meters; to a nail in a blaze in a large cottonwood north-northwesterly 12.34 meters; to a nail in a blaze in a crooked cottonwood northerly 20.79 meters; to a nail in a blaze in a cottonwood easterly 17.07 meters.

D 7 (*U. S. E.*) (Columbia County, U. S. E., 1912). On a rocky ledge about one-fourth mile above Thayer's dock and about 8 feet above low water. The station is marked by a concrete monument with the station name and the letters "U. S. E." on its top surface.

D 6 (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). Approximately 90 meters north of the southerly end of Cottonwood Island and 18 meters inside of the high-water line. The station is marked according to note 1.[1] The following distances are given: To a forked cottonwood tree with a nail in an irregular blaze north-northeasterly 10.05 meters; to a high cottonwood stump with one limb easterly 13.87 meters.

D 5 (*U. S. E.*) (Columbia County, U. S. E., 1912). Between the tracks of the Spokane, Portland & Seattle Railway and the top of the bank of the Columbia River, 6.1 meters from the east rail, 1.52 meters from the top of the riprapped bank of the river, and 38 meters north of the north end of the railroad trestle. The station is marked according to note 1,[1] and is the same as station Twenty of the previous triangulation by the Corps of Engineers, United States Army.

D 4 (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). Up river from logging dock and old fish trap and 4.3 meters outside the high-water line. The station is marked according to note 1.[1] The following distances are given: To a blazed willow northeasterly 25.15 meters; to a blazed willow easterly 26.82 meters.

D 3 (*U. S. E.*) (Columbia County, U. S. E., 1912). At the edge of a bluff above Beaver Lumber Co. The station is marked according to note 1.[1] The distance to the smaller of two rocks off shore east-northeasterly in the direction of *D 4* (*U. S. E.*) is 33.5 meters.

D 1 (*U. S. E.*) (Columbia County, U. S. E., 1912). Near cable landing sign, on a bench of rocks 15 feet above low water. The station is marked according to note 1.[1]

D 2 (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). Down river 25 meters from Le Roy's float and stranded scows. The station is marked according to note 1.[1] North-northeasterly 28.49 meters is a willow tree 16 inches in diameter with a blaze and notch on it, and south-southeasterly 29.20 meters is a cottonwood tree 24 inches in diameter with a nail in a blaze.

Kalama (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). The station is outside the high-water mark and is marked according to note 1.[1]

Coffin Rock (*U. S. E.*) (Columbia County, Wash., U. S. E., 1913). On the southern end of Coffin Rock. The station is marked according to note 1.[1]

H 27 (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). On the river bank about 6 feet above low water and 60 meters inside of the high-water line. The station is marked according to note 1.[1]

H 30$_2$ (*U. S. E.*) (Columbia County, U. S. E., 1912). About one-fourth mile northwest of the Spokane, Portland & Seattle Railway station at Goble, on the fourth crib of the abandoned Northern Pacific Railway ferry slip counting

[1] See pp. 81 and 82.

from the northwest end. Midway, north and south, and 1.8 meters from the western end of the crib. The station is marked according to note 1.[1]

Mill (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912; 1913). About 1 mile down the river from Kalama, on the outer edge of the wharf of the Mountain Timber Co., west-northwest from the western end of the sawmill, and at a break in the wharves connected by a truss bridge. The station is marked by a twentypenny nail surrounded by a triangle of sixpenny nails. The following distances are given: To the river edge of the wharf 0.55 meter, to the shoulder in the wharf 0.61 meter, and to the electric pole southeasterly 1.83 meters.

H 28 (*U. S. E.*) (Columbia County, U. S. E., 1912). On a rocky knoll at Reuben, west of the tracks of the Spokane, Portland & Seattle Railway, and north of the north line of the old wharf. The station is marked according to note 1.[1]

Bank (Cowlitz County, Wash., E. B. L., 1913). About one-half mile south of Kalama Slough, 2 meters from the bank of the river, and approximately 6 feet above low water. The station is marked according to note 2.[1] The reference mark is according to note 5.[1] See note 3.[1]

Dock (Columbia County, E. B. L., 1913). On the northeast corner of the Beaver Lumber Co. wharf, Prescott. The station is marked by a nail with the head filed off, surrounded by a triangle of copper tacks.

Rail (Cowlitz County, Wash., E. B. L., 1913). About one-fourth mile southeast of Carrolls Bluff on the right of way of the Northern Pacific Railway, and between the tracks and the river. The station is marked according to note 2.[1]

Cotton (Cowlitz County, Wash., E. B. L., 1913). On the western side and southern end of Cottonwood Island, one-half mile west of Carrolls Bluff. The station is marked according to note 2.[1] Reference mark No. 1 is a galvanized iron pipe filled with earth and cement and set in concrete with a copper tack in its top surface, and reference mark No. 2 is according to note 7. See note 3.[1] There is a triangle on a cottonwood tree distant 45.62 meters in azimuth 234° 43′ 45″ and a similar mark on another cottonwood tree distant 50.79 meters in azimuth 290° 19′ 25″.

Cut (Columbia County, E. B. L., 1913). About 1 mile northwest of Prescott, on a rounded point between the tracks of the Spokane, Portland & Seattle Railway and the Columbia River. At the fourth rail northwest of the beginning of the curve in the track. The station is marked by a standard disk station mark set in a concrete pier in loose rock about 1 foot deep. The reference mark is a cross cut in stone with the longer arm pointing to the station. See note 3.[1]

Twenty-six 2 (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Twenty-four 2 (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Nineteen 2 (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Seventeen 2 (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Thirteen 2 (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Cottonwood Island 1913 (Cowlitz County, Wash., E. B. L., 1913). On the western shore of Cottonwood Island, midway its length. The station is marked according to note 2.[1] Reference mark No. 1 is a section of iron pipe filled with earth and cement and set in concrete, with a copper tack in its top surface. Reference mark No. 2 is according to note 7,[1] except there is no underground mark. See note 3.[1]

Old (Columbia County, E. B. L., 1913). About 1 mile southeast of Rainier, opposite the lower end of Cottonwood Island, one-fourth mile west of the Western Lumber Co.'s shingle mill, 3 meters from the bluff, and 12 feet above low water. The station is marked according to note 2.[1] The reference mark is according to note 5.[1] The post of the abandoned Doblebower front range is distant 6.5 meters in azimuth 318° 08′. See note 3.[1]

Knight (Columbia County, E. B. L., 1913). About one-fourth mile north of Goble station, on a high rocky knoll at the lower end of a ferry slip, between the road and the Spokane, Portland & Seattle Railway. The station is marked by a standard disk station mark set in a pier of concrete built on rock. The top of the pier is about 10 inches above the surface of the surrounding stone. Reference mark No. 1 is according to note 5,[1] and No. 2 is a cross cut in stone, the longer arm being in the direction of the station. See note 3.[1]

Kalama (Cowlitz County, Wash., E. B. L., 1913). About one-fourth mile south of the town of Kalama, between the Pacific highway and the Northern Pacific Railway track, 7 meters from the top of the rock cut of the railroad. The station is marked according to note 2.[1] The reference mark is the same as is described in note 5.[1] See note 3.[1]

Slue (Columbia County, E. B. L., 1913). On a sand flat, 50 meters from the river shore, and 200 meters north of the mouth of Deer Island Slough. See description of *H 26₂* (*U. S. E.*). Reference mark No. 1 is described in note 7,[1] except there is no underground mark, and reference mark No. 2 [1] is a section of galvanized-iron pipe filled with earth and cement and set in concrete, with a copper tack in its top surface. See note 3.[1]

H 26₂ (*U. S. E.*) (Columbia County, U. S. E., 1912). The station is marked according to note 1, but in July, 1913, the station was covered with 6 inches of sand. See the description of *Slue*.

Rock (Cowlitz County, Wash., E. B. L., 1913). About 1½ miles south of Kalama, in the Pacific highway, about 60 meters east of the Northern Pacific Railway tracks. There is no station mark. Both reference marks are the same as described in note 7,[1] except there is no underground mark.

Flat (Columbia County, E. B. L., 1913). On Deer Island, approximately midway between Deer Island Point and Deer Island Slough, on a sand flat 10 meters from the river shore. The station is marked according to note 2.[1] Reference mark No. 1 is a section of galvanized-iron pipe filled with earth and cement and set in concrete with a copper tack in its upper surface, and No. 2 is the same as is described in note 7,[1] except there is no underground mark.

H 21 (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912, 1913). On a rocky knoll 15 meters south-southeast from the southeast corner of a small house. The station is marked according to note 1.[1] The reference mark is a standard

[1] See pp. 81 and 82.

disk reference mark set in a hole drilled in rock and cemented. There is a triangle on a maple tree distant 28 meters in azimuth 272° 15′.

H 23₂ (U. S. E.) (Cowlitz County, Wash., U. S. E., 1912; 1913). On Ahles Point, east of the railroad tracks, easterly from the shingle mill, and 6 meters from the top of the railroad cut. The station is marked according to note 4.[1] The nearest telephone pole is northerly 9.17 meters. The reference mark is described in note 5.[1] See note 3.[1]

H 22 (U. S. E.) (Columbia County, U. S. E., 1912, 1913). In a cleared space behind dense willows, 23.8 meters inside the high-water line. The station is marked according to note 4.[1] The reference mark is the same as is described in note 7,[1] except there is no underground mark. See note 3.[1]

H 19 (U. S. E.) (Cowlitz County, Wash., U. S. E., 1912, 1913). The station is 12 meters northwest from the top of the bluff river bank and 111 meters southerly from the north gable of a yellow house. The station is marked according to note 1.[1] The reference mark is the same as is described in note 5.[1] There is a blazed triangle on a pine tree distant 10.90 meters in azimuth 299° 26′.

Hill (U. S. E.) (Cowlitz County, Wash., 1912, 1913). On a hill back of Bybee Light, northeast of the railroad tracks. The station is marked according to note 1.[1] The reference mark is the same as is described in note 5.[1] See note 3.[1]

H 20 (U. S. E.) (Columbia County, U. S. E., 1912, 1913). On a small knoll on Deer Island between two ponds, one-half mile west from the river bank, and 10.6 meters from the shore of the lake toward the river. The station is marked according to note 4.[1] The reference mark is the same as is described in note 5.[1] See note 3.[1]

Connell 2 (U. S. E.) (Columbia County, U. S. E., 1912; 1913). On the south side of a lane and 15 meters inside the high-water line, south-southeast from Mr. Connell's house, and 10 feet above low water. The station is marked according to note 4.[1] The reference mark is the same as is described in note 5.[1] There is a cottonwood stump westerly 9.75 meters. See note 3.[1]

Martin 3 (U. S. E.) (Cowlitz County, Wash., U. S. E., 1912; 1913). On the western shore of Martin's Island, 10 meters from the bank inside the high-water line. The station is marked according to note 1,[1] with the exception that the mark is 1½ feet below the surface. The reference mark is the same as is described in note 5.[1] There are triangles blazed on three cottonwood trees, one north-northeast 6.43 meters, one east 3.84 meters, and one south-southeast 10.88 meters. See note 3.[1]

H 16₂ (U. S. E.) (Columbia County, U. S. E., 1912; 1913). Between the piles on Deer Island dike, about 30 meters outside the high-water mark. The station is marked according to note 1.[1]

H 15₂ (U. S. E.) (Cowlitz County, Wash., U. S. E., 1912; 1913). About 150 meters north from Burkes Slough and 10 meters inside the high-water line. The station is marked according to note 4.[1] The reference mark is according to note 7,[1] except there is no surface mark. There is a triangular blaze on a cottonwood tree distant 4.83 meters in azimuth 236° 31′, a similar marked cottonwood tree is distant 3.95 meters in azimuth 63° 13′, and a third tree marked in the same manner is southeast 9.81 meters. The Engineer's station *Keg*, cross boards on a tree, is south 25.1 meters. See note 3.[1]

H 11 (U. S. E.) (Cowlitz County, Wash., U. S. E., 1912; 1913).—The station is outside the high-water line and is marked according to note 1.[1] The reference mark is the same as is described in note 5.[1] See note 3.[1]

H 14₂ (U. S. E.) (Columbia County, U. S. E., 1912; 1913). On a bank 12 meters inshore from the high-water line, 0.76 meter northeast of a wire fence, and 8 feet above low water. The station is marked according to note 4.[1] The reference mark is the same as is described in note 5[1] and is near the barbed-wire fence. See note 3.[1]

H 9₂ (U. S. E.) (Cowlitz County, Wash., U. S. E., 1912; 1913). About 25 meters inshore from the high-water mark, 50.20 meters north of the northwest corner of Caple's barn, 27.9 meters south of the southeast corner of a small house. The station is marked according to note 1,[1] with the exception that the top of the monument is 18 inches below the surface. The reference mark is the same as is described in note 7, except there is no underground mark,[1] and is near an old oak tree back of the unpainted house. See note 3.[1]

Dock (U. S. E.) (Columbia County, U. S. E., 1912; 1913). Near the southeastern corner of the Peninsula Lumber Co.'s wharf. The station is marked by a sixtypenny nail at the intersection of two lines of eightpenny nails and is 0.84 meter from the offshore edge and 0.82 meter from the south edge of the wharf.

H 7₂ (U. S. E.) (Cowlitz County, Wash., 1912; 1913). About one-half mile up the river from Caples Landing and 23 meters inside the high-water line. The station is marked according to note 4,[1] except that the monument is 18 inches below the surface of the ground. The reference mark is the same as is described in note 5.[1] There is a blazed willow tree with a nail driven in it northerly 24.38 meters and a similarly marked willow tree easterly 24.26 meters. See note 3.[1]

H 8₂ (U. S. E.) (Columbia County, U. S. E., 1912; 1913). On a stone-filled wharf at Columbia City, 27.28 meters from the eastern end of the storehouse, 10.67 meters west from the outside face of the wharf, and 5.49 meters north of the southern face of the crib work of the wharf. The station is marked by a 1½-inch iron pipe driven into the loose stones with cement around it. The cement is marked with the name of the station. The reference mark is the same as is described in note 5.[1] See note 3.[1]

H 5₂ (U. S. E.) (Cowlitz County, Wash., U. S. E., 1912; 1913). The station is 18 meters from the river bank, 43.6 meters south of a lane, and is marked according to note 4.[1] The reference mark is described in note 7, except there is no underground mark.[1] There is a blazed cottonwood tree southeast 16.52 meters. See note 3.[1]

[1] See pp. 81 and 82.

H 6₂ (U. S. E.) (Columbia County, U. S. E., 1912; 1913). On a rocky point about 1 mile below St. Helens, 200 meters below a rock crusher, and about 25 feet above low water. The station is marked according to note 4.[1] The reference mark is the same as is described in note 7,[1] except no underground mark. See note 3.[1]

H 3 (U. S. E.) (Cowlitz County, Wash., U. S. E., 1912; 1913). In the riprap on the offshore end of St. Helens Jetty. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except no underground mark. See note 3.[1]

H 4 (U. S. E.) (Columbia County, U. S. E., 1912; 1913). The station is on the northern end of Sauvies Island, on recently made ground, and is marked according to note 1.[1] The reference mark is described in note 5.[1] See note 3.[1]

H 1₂ (U. S. E.) (Cowlitz County, Wash., U. S. E., 1912; 1913). The station is 45 meters inshore from the high-water line and is marked according to note 4.[1] The reference mark is the same as is described in note 7,[1] except no underground mark. There is a triangular blaze on a box-elder tree distant 81.69 meters in azimuth 207° 13′.

Warrior (U. S. E.) (Columbia County, U. S. E., 1912; 1913). On Warrior Point, 1.1 meters east of the easternmost part of the house. The station is marked according to note 4.[1] The reference mark is described in note 5.[1] The following distances are given: To the northeast corner of the house 4.81 meters, to the first angle of the bay window 2.00 meters, to the second angle of the bay window and the nearest corner of the house 1.34 meters, to a locust tree northeast 3.60 meters. See note 3.[1]

Lake (U. S. E.) (Clarke County, Wash., U. S. E., 1912; 1913). At the junction of the Lewis and Columbia Rivers 10.5 meters inside the Columbia River high-water line. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except no underground mark. There is a triangular blaze on a willow tree with a nail in the center distant 8.66 meters in azimuth 308° 33′, and a similar blaze on another willow tree southerly 24.00 meters. See note 3.[1]

Eleven (U. S. E.) (Columbia County, U. S. E., 1912; 1913). The station is marked according to note 4,[1] and is 9 meters from the shore line. The reference mark is described in note 7,[1] except no underground mark. The following distances and directions are given: To blaze on cottonwood tree distant 22.65 meters in azimuth 12° 18′, to a triangular blaze on a cottonwood tree distant 17.70 meters in azimuth 139° 39′, and to an engineer's blaze northeast by north 13.29 meters. See note 3.[1]

Ten (U. S. E.) (Clarke County, Wash., U. S. E., 1912; 1913). The station is 9 meters from the bank of the river and is marked according to note 4.[1] The reference mark is described in note 7,[1] except no underground mark. The following distances to blazes on willow trees are given: Northwest, 4.33 meters; northeast, 8.78 meters; nail in blaze east-northeast, 15.00 meters; nail in blaze southeast, 8.80 meters; nail in blaze south-southwest, 8.72 meters. See note 3.[1]

Nine (U. S. E.) (Columbia County, U. S. E., 1912; 1913). Southeasterly from the southeast corner of the H. and R. Duck Club and 6 meters from the river bank. The station is marked according to note 1,[1] except that the top of the pipe is about 2 feet below the surface of the ground. The reference mark is described in note 7,[1] except no underground mark. There is a large stump east by south 4.27 meters and a nail in a fence post westerly 17.46 meters. See note 3.[1]

Eight (U. S. E.) (Clarke County, Wash., U. S. E., 1912). The station is 60 meters south of a barbed-wire fence and is marked according to note 1.[1] There is an engineer's blaze north-northeasterly 20.1 meters, one easterly 13.81 meters, and a blaze on a cottonwood tree southwesterly 7.92 meters.

Seven 2 (U. S. E.) (Columbia County, U. S. E., 1912; 1913). On the river bank about 150 meters south of the Lionite Powder Works wharf and 20 feet above low water. The station is marked according to note 4,[1] except the mark is 18 inches below the surface. The reference mark is described in note 7,[1] except there is no underground mark. There is a triangle blazed on a tree distant 18.55 meters in azimuth 63° 45′, and a similar mark on another tree distant 22.10 meters in azimuth 116° 38′. See note 3.[1]

Six (U. S. E.) (Clarke County, Wash., U. S. E., 1912; 1913). On the river bank 8 feet above low water. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. The following distances and azimuths are given: Triangular blaze on cottonwood tree distant 16.50 meters in azimuth 274° 09′; triangular blaze on cottonwood tree distant 7.65 meters in azimuth 20° 15′. The following distances and directions are given: Blaze on tree north-northeast 18.1 meters; triangular blaze on cottonwood tree east by north 17.37 meters; tree blazed on both sides west by north 8.47 meters. See note 3.[1]

Five 2 (U. S. E.) (Columbia County, U. S. E., 1912; 1913). About 300 meters south from Henrici's old house, and northeast from the yellow house on the mound. The station is marked according to note 4.[1] Reference marks No. 1 and No. 2 are described in note 7,[1] except no underground mark. There is a hickory tree distant 41.05 meters in azimuth 258° 17′. The northeast corner of the picket fence is south-southwesterly 41.7 meters and the northwest corner is southwest by south 55.41 meters. See note 3.[1]

Two (U. S. E.) (Clarke County, Wash., U. S. E., 1912).—Lost.

One 2 (U. S. E.) (Columbia County, U. S. E., 1912; 1913). In an open field 16 meters from the top of the river bank, and 10 feet above low water. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except no underground mark. The northwest corner of a large barn is distant 22.55 meters. See note 3.[1]

D (U. S. E.) (Columbia County, U. S. E., 1912; 1913). Seven meters from the top of the bank and 10 feet above the low water. The station is marked according to note 4.[1] The reference mark is described in note 5.[1] There is a nail in an old post southerly 14.2 meters and a nail in a blaze on a crooked willow tree northwesterly 24.1 meters. See note 3.[1]

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[1] See pp. 81 and 82.

A (*U. S. E.*) (Clarke County, Wash., U. S E., 1912; 1913). Ten feet above low water and 10.6 meters from the top of the river bank. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except no underground mark. There is a triangular blaze with a nail in the center on a willow tree distant 30.7 meters in azimuth 214°54′, and a similar mark on another willow tree distant 28.1 meters in azimuth 300° 32′. See note 3.[1]

E (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). The station is an open space 15 meters from the high-water line and marked as in note 4.[1] The reference mark is described in note 7,[1] except no underground mark. There is a nail in a blazed willow tree distant 31.2 meters and a notched willow tree with a nail in a blaze west-southwest 28.8 meters. See note 3.[1]

B (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). About 10 feet above low water, 12 meters from the top of the river bank, and 107 meters south-southeast from the southeast corner of an old building. The station is marked according to note 4.[1] The reference mark is described in note 5.[1] There is a blaze on a bushy tree northerly 25.08 meters, a blazed stump distant 6.72 meters in azimuth 247° 35′, and a blazed stump distant 19.80 meters in azimuth 304° 14′. See note 3.[1]

Dead Willow (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). Abreast of new landing, 18 meters from the inshore end of the wharf, north of a rose thicket. The station is marked according to note 4.[1] The reference mark is described in note 5.[1] There is a large cottonwood tree distant 12.9 meters. See note 3.[1]

C (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). About 50 meters from the river bank among large cottonwood and willow trees. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. There is a large cottonwood tree distant 19.12 meters in azimuth 83° 17′, a small blazed cottonwood tree distant 1.10 meters in azimuth 172° 09′, and a blazed cottonwood distant 6.42 meters in azimuth 305° 04′. See note 3.[1]

Grassy (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). In an open grass-covered space 10 meters from the high-water line and 137 meters southerly from the fence of a cultivated field. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. There is a nail in a blaze in a cottonwood tree southwesterly 18.1 meters and a similar mark on a cottonwood tree westerly 16.9 meters. See note 3.[1]

Fales (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). Nine meters from the top of the river bank and 0.9 meter north of a wire fence. The station is marked according to note 4,[1] with the exception that the mark is covered with 6 inches of sediment. The reference mark is on the same side of the fence as the station mark and is described in note 7,[1] except there is no underground mark. See note 3.[1]

Ridge (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). The station is in an open space about 70 meters from the river bank and is marked according to note 4.[1] The reference mark is on the inshore edge of a tongue of brushy woods and is described as in note 7,[1] except there is no underground mark. There is a blaze on a cottonwood tree southwesterly 13.9 meters and a similar mark on a cottonwood tree, distant 5.24 meters in azimuth 66° 53′. See note 3.[1]

W 11 (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912). The station is 12 meters from the top of the river bank, 27 meters south of a slough, and is marked according to note 4.[1] There are three blazed trees in the vicinity, northeast, east, and east by south from the station.

W 16 (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). About 100 meters south of Willow Bar Point, about 30 meters north of a wire fence and at the top of the partially undermined river bank. The station is marked according to note 4.[1] Reference marks No. 1 and No. 2 are described in note 7,[1] except there is no underground mark. There is a triangle blazed on a cottonwood tree, distant 20.82 meters in azimuth 113° 15′ 21″. See note 3.[1]

W 14 (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). On the west edge of a road about 10 meters from the river bank, 90 meters south of the north face of Bonser's house and about 90 meters from Petes Island. The station is marked according to note 4.[1] The reference mark is on the east side of a fence and is described in note 7[1], except there is no underground mark. See note 3.[1]

W 9 (*U. S. E.*) (Clarke County, Wash., 1912; 1913). In the woods 10 meters from the top of the river bank marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. There is a blazed tree northerly 2.35 meters, one easterly 4.27 meters, and one southwesterly 2.38 meters. See note 3.[1]

W 12_2 (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). In an open field about 305 meters west of the river bank and 150 meters north of a wire fence. The station is marked according to note 1.[1] There is a barn northeastly about 244 meters, and the north chimney of a brick house is southeasterly about 245 meters.

W 7_2 (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). At the top of the river bank, entirely undermined, and will probably be destroyed during the next high water. The station is marked according to note 1.[1] Reference mark No. 1 is described in note 7,[1] except there is no underground mark, and No. 2 is a 1½-inch iron pipe set in and filled with cement. There is a 2-inch iron pipe set in the ground, distant 18.32 meters, a blaze on a willow tree north by east 6.4 meters, and 2 notches on a willow tree easterly 6.52 meters. See note 3.[1]

W 10_2 (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). The station is 1 meter west of an old fence and 115 meters south from the south line of a barn, north 72 meters from the wire fence running east and west, and marked according to note 4.[1] The reference mark is described in note 5.[1] See note 3.[1]

W 5_2 (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). The station is 22 meters from the river bank and is marked according to note 1,[1] except the station mark is 6 inches below the surface of the ground. The reference mark is described in note 7,[1] except there is no underground mark. See note 3.[1]

[1] See pp. 81 and 82.

Range 2 (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). The station is on the river bank and is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. There is a blaze on an old cottonwood tree, distant 32.0 meters in azimuth 286° 14′. See note 3.[1]

W 8_2 (*U. S. E.*) (Columbia County, U. S. E., 1912). In a small field westerly from Reeder's house and 2.4 meters west of a north and south fence. The station is marked according to note 1,[1] except the top of the pipe is 2 feet below the surface of the ground. There is a nail in the center of a triangular blaze on a fence post north-northwest 27.4 meters and a similar mark north-northeast 18.8 meters.

W 6 (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). The station is on a point south of Reeder's landing on top of a partly undermined bank and is marked according to note 1.[1] The reference mark is described in note 7,[1] except there is no underground mark. The following directions and distances are given: Pipe in the ground 15.89 meters; blazed tree south-southwest 42.67 meters; blazed tree westerly 27.73 meters; blazed tree with one notch southwest 10.88 meters; blazed tree south-southwest 12.74 meters. See note 3.[1]

W 3 (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). On the shore of a slough behind a new island at Willow Bar, 2.4 meters west of a barnyard fence and 9.3 meters south from the south side of a farm road. The station is marked according to note 1,[1] except that the mark is 2 feet below the ground. The reference mark is described in note 7,[1] except there is no underground mark, and is at the southwest corner of a barnyard outside the fence and in the farm road. The southwest corner of the barn is south-southwest 39.0 meters. See note 3.[1]

W 4_2 (*U. S. E.*) (Multnomah County, U. S. E., 1912). The station is 90 meters north of Reeders Point and is marked according to note 4.[1] The reference mark is described in note 5.[1] There is a blazed cottonwood tree north by east 14.0 meters, a cottonwood tree with a similar mark northeast 6.55 meters, and a small tree east-southeast 5.64 meters. See note 3.[1]

W 1 (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912). On a slough behind a new island near Willow Bar, in a cultivated field 100 meters north of a big barn. The station is marked according to note 1,[1] except the mark is 2 feet below the ground. There is a triangle, with a nail, on a fence N. 54° E. magnetic distant 23.77 meters and a nail on a fence post S. 75 E., distant 21.64 meters. There is a fence easterly 20.5 meters.

W 2_2 (*U. S. E.*) (Multnomah County, U. S. E., 1912; 1913). About 3 meters from the mud bank of the river, 6 feet above low water, and one-half meter north of a wooden fence. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark, and is near the same fence as the station. The northeast corner of James McIntire's house is southwesterly 93.5 meters. There is a blazed tree west by south 40 meters and one west by north 35.5 meters. See note 3.[1]

Jewetts (*U. S. E.*) (Multnomah County, U. S. E., 1912). About 150 meters west of the river bank and 22 meters east of a fence at Jewett's house. The station is marked according to note 1.[1] There is a blazed tree with three notches southwesterly 28.9 meters, a blazed tree west by north 21.9 meters, and a blazed tree with one notch northwesterly 30.2 meters.

Hewletts 2 (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912). North of Hewletts Point, 10.5 meters east of the high-water line, 1.4 meters south of a fence, 8.8 meters northeast of the northeast corner of a shack, and west-southwesterly 44.5 meters from a blazed cottonwood tree. The station is marked according to note 4.[1]

Morgans 2 (*U. S. E.*) (Multnomah County, U. S. E., 1912; 1913). At Morgans Landing, 10 meters west of the top of the riprapped river bank, 19.8 meters south of Morgan's barn, 27.85 meters south-southeast of the southwest corner of the barn, 1.5 meters south of the barnyard fence, and 4.3 meters east of a north and south fence. The station is marked according to note 4,[1] except that the mark is 6 inches below the surface. The reference mark is described in note 5.[1] See note 3.[1]

One 3 (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). About 33 meter from the top of the river bank, 15 feet above low water, 0.6 meter south of an east and west fence and about 73 meters north of another one. The station is marked according to note 4.[1] The reference mark is described in note 5.[1] See note 3.[1]

Two 2 (*U. S. E.*) (Multnomah County, U. S. E., 1912; 1913.) The station is in an open, uncultivated field and is marked according to note 4.[1] The reference mark is described in note 5.[1] See note 3.[1]

Middle (Clarke County, Wash., E. B. L., 1913). About 30 meters from the east bank of the Columbia River, 150 meters northwest of Blurock Landing, and 15 feet above low water. The station is marked according to note 2.[1] The reference mark is described in note 5.[1] See note 3.[1]

Four 2 (*U. S. E.*) (Multnomah County, U. S. E., 1912; 1913). On the west bank of the entrance of Willamette River, 8 feet above low water. The station is marked according to note 4.[1] The reference mark is described in note 5.[1] There is a blazed tree distant 16.4 meters in azimuth 70° 48′, a triangular blaze on a tree distant 17.0 meters in azimuth 132° 37′, and a blazed tree southerly 16.2 meters. See note 3.[1]

Mud (Multnomah County, E. B. L., 1913). On Nigger Tom Island, 5 meters from the east shore of the Willamette River. The station is marked according to note 2.[1] Reference marks No. 1 and No. 2 are described in note 5.[1] See note 3.[1]

School (Multnomah County, E. B. L., 1913). About 200 meters from the west shore of the Willamette River, opposite Pearcy Slough. The station is marked according to note 2.[1] The reference mark is described in note 5. The station is 45.8 meters south of the north fence corner, 30.3 meters north of the south corner, and 2 meters from the fence toward the river. See note 3.[1]

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[1] See pp. 81 and 82.

Three S (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). About one-half mile south of Blurock Landing, 34.7 meters east of a fence parallel with the river and 0.4 meter south of a fence at right angles to the river. The station is marked according to note 4.[1] The reference mark is 1.2 meters south of a fence and is described in note 5.[1] See note 3.[1]

End (Multnomah County, E. B. L., 1913). About 30 meters from the top of the west bank of the Columbia River, 200 meters north of the Willamette River entrance, and 15 feet above low water. The station is marked according to note 2.[1] The reference mark is described in note 5.[1] There is a triangular blaze on a dead tree distant 14.1 meters in azimuth 27° 38′. See note 3.[1]

Pen (Multnomah County, E. B. L., 1913). On the east bank of the Willamette River, opposite the lower end of Post Office Bar, 200 meters from the northwest shore of Ramsey Lake, and 125 meters north of the line of woods. The station is marked according to note 2.[1] The reference mark is described in note 5.[1] See note 3.[1]

Linton (Multnomah County, E. B. L., 1913). About one-fourth mile west of Linton and about three-fourths of the way up the hillside. The station is marked according to note 2.[1] The reference mark is described in note 5.[1] There are two blazed fir trees, one distant 6.5 meters in azimuth 10° 11′, and the other distant 5.3 meters in azimuth 304° 2′. See note 3.[1]

Sand (Multnomah County, E. B. L., 1913). On a sand spit on the east side of the Willamette River, 30 meters from the shore. The station is marked according to note 2.[1] The reference mark is described in note 5.[1] See note 3.[1]

Howell (Columbia County, C. R., 1881; 1913). On the west shore of the Willamette River, 113 meters from the top of the bank, 2.3 meters from a fence. The station is marked by a bottle 3 feet below the surface, and directly over this, 1 foot below the surface, is a drill hole in a rock. At the surface there is a standard disk station mark set in concrete. Reference marks Nos. 1 and 2 are described in note 5.[1] See note 3.[1]

Gatton (Multnomah County, C. R., 1883; 1913). About 2 miles north of St. Johns, near the end of the high ground between the Columbia and Willamette Rivers, 8 meters south of the top of the bluff. The station is marked by a bottle with a copper tack in the cork buried 3 feet deep; 14 inches below the surface there are 3 bottles with the necks pointing to the station, and at the surface is a standard disk station mark set in concrete. Reference mark No. 1 is described in note 5,[1] and No. 2 is a drill hole filled with lead in a large basaltic rock. See note 3.[1]

Springville (Multnomah County, C. R., 1883). On the west bank of the Willamette about 1 mile below St. Johns, about 200 feet above the river level on a sloping bench of land immediately back of an old burnt wharf called Springville. The station is marked according to note 8.[1] There are three cedar stakes around the station as follows: South 1.87 meters, east 1.86 meters, and west 1.83 meters.

Watts (Multnomah County, C. R., 1883). On the west side of the Willamette River, on the right of way of the Northern Pacific Railway and 13.4 meters west of the tracks, and 1.64 meters inside the fence. The station is marked according to note 8.[1] There are three cedar stakes around the station as follows: North 1.77 meters, west 1.78 meters, and east 1.77 meters.

Kaiser (Multnomah County, C. R., 1883). On the hillside west of the county road and the railroad. The station is marked according to note 8.[1] There are three cedar stakes around the station, as follows: North 1.86 meters, south 1.89 meters, and east 1.71 meters.

St. John (Multnomah County, C. R., 1883). On low bottom land close to the shore, 17 meters northeast of a fence running across from the hills, 5.5 meters south of a group of ash tree stumps. The station is marked according to note 8.[1] There are three cedar stakes around the station bearing north, south, and east, respectively, and each distant 1.83 meters.

Caples (Multnomah County, C. R., 1883; 1913). About one-half mile from the business center of St. Johns, 5 meters from the edge of a sand bluff abreast of St. Johns dry dock, and 100 feet above low water. The station is marked by a tack in the cork of a bottle 3 feet below the surface; buried 1 foot are 3 bottles with their necks pointing to the station, and at the surface there is a drill hole filled with lead in a large rock. The reference mark is described in note 5.[1] See note 3.[1]

Hazel (Multnomah County, C. R., 1883). About 30 meters southwest of the Northern Pacific Railway tracks and about 90 meters above the 7-mile post from Portland. The station is marked according to note 8.[1] There are three cedar stakes around the station bearing north 1.83 meters, west 1.80 meters, and east 1.86 meters, respectively.

Waud (Multnomah County, C. R., 1882; 1883). On the east bank of the Willamette River about 1 mile above St. Johns, 9 meters from the edge of the bluff, and about 120 feet above the ordinary stage of the river. The station is marked according to note 8.[1] There are three cedar stakes with copper tacks in the top around the station, as follows: West 1.83 meters, east 1.83 meters, and south 1.87 meters.

Scott (Multnomah County, C. R., 1882; 1913). About 2 miles south of St. Johns, 1½ miles west of the north end of Swan Island, in the grounds of Cliff Inn. The station is marked by a tack in the cork of a bottle 3 feet below the surface, 14 inches below the surface by 3 bottles with their necks pointing to the station, and at the surface by a drill hole filled with lead in a rock. The reference mark is described in note 5.[1] The rear chimney of Cliff Inn is in azimuth 232° 41′, and the round barn is in azimuth 307° 01′. See note 3.

Gravel Bluff (Multnomah County, C. R., 1882; 1883).—Lost.

Potter (Multnomah County, C. R., 1883). On the south side of the Willamette River about 4½ miles below Portland, 90 meters back of the county road, and 3 meters west of a rail fence inclosing a garden. The station is marked according to note 8.[1] The surface mark was reported lost in 1913.

[1] See pp. 81 and 82.

Montgomery (Multnomah County, C. R., 1882; 1883).—Lost.

King (Multnomah County, C. R., 1883). On the nose of a high ridge back of Portland in continuation of the blocks between F and G Streets, 10 meters back of the fence between the Johnson and King properties, and 13 meters from the fence corner. The station is marked according to note 8,[1] except there is no surface mark.

Tibbetts (Multnomah County, C. R., 1882; 1883). On the east side of the Willamette River nearly opposite the north end of Ross Island, nearly at the top of a bluff in a locality entirely cleared of trees. The station is marked according to note 8.[1] There are three cedar stakes around the station as follows: North 1.56 meters, south 1.89 meters, and west 1.83 meters.

Hoffmans Hill (Multnomah County, C. R., 1883). The station is marked according to note 8.[1] The surface mark was reported lost in 1913.

Forty (*U. S. E.*) (Multnomah County, U. S. E., 1909; 1913,. On the south bank of the Willamette River, in the city of Portland, opposite the western end of Swan Island and about 8 feet above low water. The station is marked according to note 4.[1] The reference mark is described in note 5.[1] See note 3.[1]

R (*U. S. E.*) (Multnomah County, U. S. E., 1909; 1913). About 270 meters eastward of the western end of Swan Island and outside the high-water line. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. See note 3.[1]

Thirty-nine 2 (*U. S. E.*) (Multnomah County, U. S. E., 1912). On a hill in St. Johns, about 100 feet above low water and about 100 meters from the Standard Oil Co.'s dock. The station is marked according to note 1.[1]

Thirty-eight 2 (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is in an open field and is marked according to note 17.[1]

Dike (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is on a high bluff behind a sawmill and is marked according to note 17.[1]

Thirty-seven (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Thirty-eight (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

Forty-one (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

Forty-two (*U. S. E.*) (Multnomah County, U. S. E., 1892). The station is near a slough and is marked by a pipe.

Forty-three (*U. S. E.*) (Multnomah County, U. S. E., 1906). The station is marked by a pipe.

Forty-four (*U. S. E.*) (Multnomah County, U. S. E., 1909; 1913). On the south bank of the Willamette River, in the city of Portland, 8 feet above low water. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. See note 3.[1]

F (*U. S. E.*) (Multnomah County, U. S. E., 1909). The station is on Swan Island and is marked according to note 1.[1]

T (*U. S. E.*) (Multnomah County, U. S. E., 1909; 1913). On the edge of a bluff on the southwest side of Willamette Boulevard, in the city of Portland, and opposite the storehouse at 465 Lombard Street. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. See note 3.[1]

P (*U. S. E.*) (Multnomah County, U. S. E., 1909; 1913). Nearly on the extension of the north curb line of Willamette Avenue, in front of No. 249 Willamette Boulevard, Portland. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. See note 3.[1]

Thirty-six (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

Forty-five (*U. S. E.*) (Multnomah County, U. S. E., 1906). The station is marked by a pipe, near P. F. Mills. (Harbor-line monument.)

Forty-five 2 (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

Forty-six 2 (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

Forty-seven (*U. S. E.*) (Multnomah County, U. S. E., 1906). The station is marked by a tack near the lower end of old ballast dock.

Forty-eight 2 (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

Forty-nine 2 (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

Fifty 2 (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

Fifty-one 2 (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

Fifty-two 2 (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

Fifty-three 2 (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

Fifty-four 2 (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

Fifty-five 2 (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

Fifty-six 2 (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

Fifty-seven 2 (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

Fifty-eight 2 (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

Fifty-nine 2 (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 17.[1]

Thirty-five (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is at St. Johns and is marked by a pipe. It is a harbor-line monument.

Thirty-four (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is near a slough and is marked according to note 17.[1]

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[1] See pp. 81 and 82.

Thirty-three (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17,[1] and is a harbor-line monument.

Thirty-two (*U. S. E.*) (Multnomah County, U. S. E., 1899). This station is marked by a pipe and is a harbor-line monument.

Thirty (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Thirty-one (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Twenty-nine (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Twenty-eight (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Twenty-six (*U. S. E.*) (Multnomah County, U. S. E., 1899). Lost.

Twenty-seven (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Twenty-five (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

Twenty-four (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

Twenty-three (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

Twenty-two (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is on a revetment.

Twenty-one (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Twenty (*U. S. E.*) (Multnomah County, U. S. E., 1899). Lost.

Nineteen (*U. S. E.*) (Multnomah County, U. S. E., 1899). Lost.

Eighteen (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Seventeen (*U. S. E.*) (Multnomah County, U. S. E., 1899). Lost.

Sixteen (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

Fifteen (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

Fourteen (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

Thirteen (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

Twelve (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

Eleven (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

Ten (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

Nine (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Eight (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Six (*U. S. E.*) (Multnomah County, U. S. E., 1899). Lost.

Seven (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

Four (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe in a revetment.

Five (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

SUPPLEMENTARY POINTS.

Jetty A (Clatsop County, J. S. H., 1909). On the jetty at the mouth of the Columbia River. The jetty has been measured and marked by the United States Engineers, and this station is at the Engineers' mark 33+00. There is no other station mark.

Jetty B (Clatsop County, J. S. H., 1909). On the jetty at the mouth of the Columbia River. The jetty has been measured and marked by the United States Engineers and this station is at their mark 146+85. There is no other station mark.

Jetty C (Clatsop County, J. S. H., 1909). On the jetty at the mouth of the Columbia River. The jetty has been measured and marked by the United States Engineers and this station is at their mark 179+36. The station is marked on the beam midway between the two tracks by three nails driven in to form a triangle.

Jetty D (Clatsop County, J. S. H., 1909). On the jetty at the mouth of the Columbia River. The jetty has been measured and marked by the United States Engineers and this station is at their mark 186+56. The station is marked on the beam midway between the two tracks by three nails driven in to form a triangle.

Jetty E (Clatsop County, J. S. H., 1909). On the jetty at the mouth of the Columbia River. The jetty has been measured and marked by the United States Engineers and this station is at their mark 246+10. The station is marked on the beam midway between the two tracks by three nails driven in to form a triangle.

Jetty F (Clatsop County, J. S. H., 1909). On the jetty at the mouth of the Columbia River. The jetty has been measured and marked by the United States Engineers and this station is at their mark 255+28. The station is marked on the beam midway between the two tracks by three nails driven in to form a triangle.

West end of jetty (Clatsop County, J. S. H., 1909). On the jetty at the mouth of the Columbia River. The station is marked on the beam midway between the two tracks by three nails driven in to form a triangle.

Gun (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is on a battery at Fort Stevens.

Smith (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument.

Old Point Ellice (*U. S. E.*) (Pacific County, Wash., U. S. E., 1905). Lost.

Seal (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument with a 2-inch pipe for the center.

Elliott (*U. S. E.*) (Wahkiakum County, Wash., U. S. E., 1905; 1913). Lost.

Marsh (*U. S. E.*) (Clatsop County, U. S. E., 1905; 1913). On Marshy Islands, below Woody Island. The station is marked according to note 1.[1] There are no reference marks.

[1] See pp. 81 and 82.

Old Jim Crow (*U. S. E.*) (Wahkiakum County, Wash., U. S. E., 1905). Lost.

Astoria (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument with a 2-inch pipe in the center.

Dot (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument with a 2-inch pipe for the center.

Alderbrook (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument with a 2-inch pipe for the center.

Old Tongue (*U. S. E.*) (Clatsop County, U. S. E., 1905; 1913). This station was recovered in 1913, but the marking is not known.

Bear (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument.

Tongue Point Neck (Clatsop County, R. D. C., 1851). On the summit of the ridge of the narrow neck of land connecting Tongue Point with the mainland, about 40 feet above the tide. The station is marked according to note 8,[1] except there is no surface mark.

Shortis Chimney (Clatsop County, R. D. C., 1852; 1885). The center chimney of a dilapidated house standing quite close to the shore between Upper Astoria and Tongue Point.

Yellow Bluff (Wahkiakum County, Wash., R. D. C., 1851). On the east side of Grays Bay on a bank 7 feet above the high-water mark. It is at the foot of a remarkable yellow bluff on ground formed by a slide from the hill above. The station is marked according to note 8.[1]

John Day Point (Clatsop County, R. D. C., 1851). About 2 miles S. 42° E. magnetic from Tongue Point, 25 feet above the river, on a rocky point forming the eastern side of the mouth of John Day River. The station is marked according to note 8,[1] except there is no surface mark.

Settlers Point (Clatsop County, R. D. C., 1852). On a small clearing, 18 meters from the high-water mark, and 80 feet above the tide. The station is marked according to note 8 [1], except there is no surface mark.

Grays Bay (Wahkiakum County, Wash., R. D. C., 1852). Lost.

Grays River (Wahkiakum County, Wash., R. D. C., 1852). In the center of a small clearing, 3 feet above the tide, on the east side of the mouth of the Grays River. The station is marked according to note 8,[1] except there is no surface mark.

Alamicut Point (Wahkiakum County, Wash., R. D. C., 1852). On the extremity of Alamicut Point. The station is marked according to note 8,[1] except there is no surface mark.

Welch (Clatsop County, C. R., 1871). On a sand beach on the north side of an island on the south side of the main channel, about 520 meters from Welch's fish house. The station is marked according to note 9,[1] except the surface mark was omitted.

Puget (Wahkiakum County, Wash., C. R., 1871). On the extreme northwest point of Puget Island, 18 meters from the shore on each side. The station is marked according to note 8,[1] except there is no surface mark.

Point Basalt (Wahkiakum County, Wash., C. R., 1871). On the edge of the basaltic cliffs, 540 meters above the wharf, 60 meters from the shore, and 200 feet above the river. The station is marked according to note 9,[1] except the surface mark is omitted and the three stakes are distant 1.83 meters.

Tenasillihee (Clatsop County, C. R., 1871). About 10 meters from the shore on the northeast point of Tenasillihee Island. The station is marked according to note 9,[1] except that the surface mark is omitted, and the distance to the three stakes is 1.83 meters.

Snag (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument with a 2-inch pipe for the center.

Skamokowa (*U. S. E.*) (Wahkiakum County, Wash., 1905). The station is marked by a concrete monument.

Pole (Wahkiakum County, Wash., E. B. L., 1913). About 1 mile west of Cathlamet on the lower or northern end of Puget Island, below high-water. The station is marked by a 1½-inch galvanized-iron pipe, 5 feet long and projecting 2 feet above the surface of the ground. The pipe is filled with cement and a standard disk station mark is set in the top.

Bugby Hole Eccentric (Clatsop County, E. B. L., 1913). About 200 meters north of Bugby Hole Creek and 5 rails north of the end of the Spokane, Portland & Seattle Railway trestle. The station is marked according to note 2,[1] with the addition that there is a 1½-inch galvanized-iron pipe extending from immediately under the standard disk station mark down nearly to the underground mark. The reference mark is the same as is described in note 5.[1] See note 3.[1]

Burroughs (Wahkiakum County, Wash., C. R., 1872). About 2½ miles above the wharf at Cathlamet, 10 meters from the edge of the bank, 154 feet above the river level, and 75 meters southeast of a small log cabin. The station is marked according to note 9,[1] except the surface mark and the stakes are omitted.

Sandy Point (Wahkiakum County, Wash., C. R., 1872). On the extreme northwest point of the second island above Cathlamet. The station is marked according to note 9,[1] except the surface mark and the stakes are omitted.

Mouth (Clatsop County, C. R., 1872). On a point of the island formed by the Columbia River and Westport Slough, and one-half mile below Westport Wharf. The station is marked according to note 8.[1]

Gruber (Columbia County, C. R., 1873). About 80 meters from the bank of Westport Slough at the point where it makes a rectangular bend, on a bench of land 152 feet above tidewater. The station is marked according to note 8,[1] except there is no surface mark. Three stakes bear north, south, and east magnetic, distant 1.83 meters.

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[1] See pp. 81 and 82.

Skunk Cabbage Ridge (Columbia County, C. R., 1873). About 4½ miles above Westport on the nose of a high ridge of land overlooking Marshfield, and 300 meters west of a small stream in a deep ravine. The station is marked according to note 8,[1] except the surface mark is a portion of the center pole of the old signal.

Holland (Columbia County, C. R., 1873). About 2 miles below Oak Point, 200 meters west of Mr. Holland's house, and about 12 meters from the shore. The station is marked according to note 8,[1] except the surface mark is a section of the original center pole of the signal. Three stakes bear north, south, and east magnetic, distant 1.83 meters.

Wallaces Island (Columbia County, C. R., 1873). On the sandy shore at the head of Wallaces Island. The station is marked according to note 8,[1] except the surface mark is omitted. Three stakes bear north, south, and east magnetic, distant 1.83 meters.

Eagle Cliff (Cowlitz County, Wash., C. R., 1873). About 1 mile east of George Hume's fishery, 1½ miles below the wharf at Oak Point, and nearly opposite Holland's fish house. The station is marked by a drill hole, filled with lead, in a large rock.

Alder Bluff (Cowlitz County, Wash., C. R., 1873). About 4 miles above Oak Point, 1½ miles from Solo Slough, on a basaltic cliff nearly perpendicular 130 feet above the river level. The station is marked according to note 8,[1] except there is no surface mark. Three stakes bear north, south, and east magnetic, distant 1.83 meters.

Monticello (Cowlitz County, Wash., C. R., 1873). Midway between Monticello and Freeport, 20 meters from the river bank, and 4 meters from a fence. The station is marked according to note 8,[1] except there is no surface mark. Three stakes around the station have the following magnetic bearings and distances: north 1.83 meters, east 1.83 meters, and south 1.89 meters.

Cowlitz (Cowlitz County, Wash., C. R., 1873). On the northwest side of the Columbia River at the mouth of the Cowlitz River, opposite Rainier, and 4 meters from the edge of the bank. The station is marked according to note 8,[1] except there is no surface mark. Three stakes around the station bear north, south, and east magnetic, distant 1.83 meters.

Cottonwood Island (Cowlitz County, Wash., C. R., 1873). About 1 mile east of the mouth of the Cowlitz River, on the lower end of Cottonwood Island, 20 meters from the north shore, and 30 meters from the south shore. The station is marked according to note 8,[1] except there is no surface mark. Three stakes were set bearing magnetic north, south, and east, distant 1.83 meters.

Bluff (U. S. E.) (Cowlitz County, Wash., U. S. E., 1912). On a bluff 10 meters south from the northwest corner of a powder house. The station is marked by a pipe driven in the ground.

Bend (U. S. E.) (Columbia County, U. S. E., 1912). On Deer Island Point, 27 meters inside the high-water line, and 24 meters from the willows and brush. The station is marked according to note 1.[1]

H 24 (U. S. E.) (Columbia County, U. S. E., 1912). The station is 106.7 meters southwesterly from the high-water line, back in the bushes, and is marked according to note 1.[1]

Old Orchard (Columbia County, C. R., 1878). On a bluff sandy bank on the south end of Deer Island, 9 meters from the shore, about 200 meters above a house. The station is marked according to note 8,[1] with the addition of a plank placed 6 inches above the underground mark, with a hole bored in it to mark the station. There are 3 stubs, with a copper tack in the top of each, distant 1.83 meters.

Maxwell (Cowlitz County, Wash., C. R., 1878). About 7 meters from the edge of a low bank, 60 meters southeast of the wharf at Maxwells Landing. The station is marked according to note 8.[1] Three stakes were set around the station, as follows: South, 1.86 meters, north and east, each 1.83 meters.

Adams (Columbia County, C. R., 1878). About three-fourths mile below Columbia City, on a gravelly bank between the county road and the shore, about 45 meters from the shore and 9 meters east of the road, directly opposite Maxwells Landing, and 60 feet above the river level. The station is marked according to note 8.[1] Three cedar stakes are set as follows: North, 1.86 meters, east, 1.83 meters, and south, 1.80 meters. Three copper tacks in a blazed fir tree bear N. 8° 53′ E. magnetic, distant 5.5 meters.

Carruthers (Cowlitz County, Wash., C. R., 1878). On a small point of hard clay a short distance above St. Helens. The station is marked according to note 8.[1] Three stakes were set as follows: North, 1.83 meters, east, 1.93 meters, and south, 1.83 meters.

Lemont (Columbia County, C. R., 1878). About one-half mile below St. Helens, on top of a cliff of nearly bare rock, 5.8 meters from the edge, on a small knoll. The station is marked by a drill hole, filled with lead, in the solid rock. Three copper tacks in a triangular blaze on a fir tree bear N. 32° W. magnetic, distant 42.55 meters, and a similar mark on a fir tree bears S. 25° W. magnetic, distant 53.37 meters.

Balsam (Cowlitz County, Wash., C. R., 1878). On the east bank of the Columbia River opposite St. Helens, on a low shore 16 meters from the edge of the water, and 30 meters north of a small creek. The station is marked according to note 8.[1] Three stakes were set as follows: North, 1.81 meters, east, 1.87 meters, and south, 1.81 meters. Three copper tacks in a triangular blaze on a balsam tree bear N. 73° E., distant 2.71 meters, and a similar mark on another balsam tree bears S. 53° E., distant 7.94 meters.

Russell (Cowlitz County, Wash., C. R., 1878). On the east side of the Columbia River, one-half mile below the mouth of the Lewis River, opposite Willamette Slough, on a sand ridge 4 meters from the shore. The station is marked according to note 8.[1] Three stakes were set as follows: North, 1.79 meters, east, 1.80 meters, and south, 1.83 meters. There are three copper tacks in a triangular blaze in a balm tree N. 30.5° E. distant 6.94 meters, and another tree marked in the same way bears S. 80° E., distant 6.82 meters.

[1] See pp. 81 and 82.

Old Jim Crow (*U. S. E.*) (Wahkiakum County, Wash., U. S. E., 1905). Lost.

Astoria (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument with a 2-inch pipe in the center.

Dot (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument with a 2-inch pipe for the center.

Alderbrook (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument with a 2-inch pipe for the center.

Old Tongue (*U. S. E.*) (Clatsop County, U. S. E., 1905; 1913). This station was recovered in 1913, but the marking is not known.

Bear (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument.

Tongue Point Neck (Clatsop County, R. D. C., 1851). On the summit of the ridge of the narrow neck of land connecting Tongue Point with the mainland, about 40 feet above the tide. The station is marked according to note 8,[1] except there is no surface mark.

Shortis Chimney (Clatsop County, R. D. C., 1852; 1885). The center chimney of a dilapidated house standing quite close to the shore between Upper Astoria and Tongue Point.

Yellow Bluff (Wahkiakum County, Wash., R. D. C., 1851). On the east side of Grays Bay on a bank 7 feet above the high-water mark. It is at the foot of a remarkable yellow bluff on ground formed by a slide from the hill above. The station is marked according to note 8.[1]

John Day Point (Clatsop County, R. D. C., 1851). About 2 miles S. 42° E. magnetic from Tongue Point, 25 feet above the river, on a rocky point forming the eastern side of the mouth of John Day River. The station is marked according to note 8,[1] except there is no surface mark.

Settlers Point (Clatsop County, R. D. C., 1852). On a small clearing, 18 meters from the high-water mark, and 80 feet above the tide. The station is marked according to note 8 [1], except there is no surface mark.

Grays Bay (Wahkiakum County, Wash., R. D. C., 1852). Lost.

Grays River (Wahkiakum County, Wash., R. D. C., 1852). In the center of a small clearing, 3 feet above the tide, on the east side of the mouth of the Grays River. The station is marked according to note 8,[1] except there is no surface mark.

Alamicut Point (Wahkiakum County, Wash., R. D. C., 1852). On the extremity of Alamicut Point. The station is marked according to note 8,[1] except there is no surface mark.

Welch (Clatsop County, C. R., 1871). On a sand beach on the north side of an island on the south side of the main channel, about 520 meters from Welch's fish house. The station is marked according to note 9,[1] except the surface mark was omitted.

Puget (Wahkiakum County, Wash., C. R., 1871). On the extreme northwest point of Puget Island, 18 meters from the shore on each side. The station is marked according to note 8,[1] except there is no surface mark.

Point Basalt (Wahkiakum County, Wash., C. R., 1871). On the edge of the basaltic cliffs, 540 meters above the wharf, 60 meters from the shore, and 200 feet above the river. The station is marked according to note 9,[1] except the surface mark is omitted and the three stakes are distant 1.83 meters.

Tenasillihee (Clatsop County, C. R., 1871). About 10 meters from the shore on the northeast point of Tenasillihee Island. The station is marked according to note 9,[1] except that the surface mark is omitted, and the distance to the three stakes is 1.83 meters.

Snag (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument with a 2-inch pipe for the center.

Skamokowa (*U. S. E.*) (Wahkiakum County, Wash., 1905). The station is marked by a concrete monument.

Pole (Wahkiakum County, Wash., E. B. L., 1913). About 1 mile west of Cathlamet on the lower or northern end of Puget Island, below high-water. The station is marked by a 1½-inch galvanized-iron pipe, 5 feet long and projecting 2 feet above the surface of the ground. The pipe is filled with cement and a standard disk station mark is set in the top.

Bugby Hole Eccentric (Clatsop County, E. B. L., 1913). About 200 meters north of Bugby Hole Creek and 5 rails north of the end of the Spokane, Portland & Seattle Railway trestle. The station is marked according to note 2,[1] with the addition that there is a 1½-inch galvanized-iron pipe extending from immediately under the standard disk station mark down nearly to the underground mark. The reference mark is the same as is described in note 5.[1] See note 3.[1]

Burroughs (Wahkiakum County, Wash., C. R., 1872). About 2½ miles above the wharf at Cathlamet, 10 meters from the edge of the bank, 154 feet above the river level, and 75 meters southeast of a small log cabin. The station is marked according to note 9,[1] except the surface mark and the stakes are omitted.

Sandy Point (Wahkiakum County, Wash., C. R., 1872). On the extreme northwest point of the second island above Cathlamet. The station is marked according to note 9,[1] except the surface mark and the stakes are omitted.

Mouth (Clatsop County, C. R., 1872). On a point of the island formed by the Columbia River and Westport Slough, and one-half mile below Westport Wharf. The station is marked according to note 8.[1]

Gruber (Columbia County, C. R., 1873). About 80 meters from the bank of Westport Slough at the point where it makes a rectangular bend, on a bench of land 152 feet above tidewater. The station is marked according to note 8,[1] except there is no surface mark. Three stakes bear north, south, and east magnetic, distant 1.83 meters.

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[1] See pp. 81 and 82.

Skunk Cabbage Ridge (Columbia County, C. R., 1873). About 4½ miles above Westport on the nose of a high ridge of land overlooking Marshfield, and 300 meters west of a small stream in a deep ravine. The station is marked according to note 8,[1] except the surface mark is a portion of the center pole of the old signal.

Holland (Columbia County, C. R., 1873). About 2 miles below Oak Point, 200 meters west of Mr. Holland's house, and about 12 meters from the shore. The station is marked according to note 8,[1] except the surface mark is a section of the original center pole of the signal. Three stakes bear north, south, and east magnetic, distant 1.83 meters.

Wallaces Island (Columbia County, C. R., 1873). On the sandy shore at the head of Wallaces Island. The station is marked according to note 8,[1] except the surface mark is omitted. Three stakes bear north, south, and east magnetic, distant 1.83 meters.

Eagle Cliff (Cowlitz County, Wash., C. R., 1873). About 1 mile east of George Hume's fishery, 1½ miles below the wharf at Oak Point, and nearly opposite Holland's fish house. The station is marked by a drill hole, filled with lead, in a large rock.

Alder Bluff (Cowlitz County, Wash., C. R., 1873). About 4 miles above Oak Point, 1½ miles from Solo Slough, on a basaltic cliff nearly perpendicular 130 feet above the river level. The station is marked according to note 8,[1] except there is no surface mark. Three stakes bear north, south, and east magnetic, distant 1.83 meters.

Monticello (Cowlitz County, Wash., C. R., 1873). Midway between Monticello and Freeport, 20 meters from the river bank, and 4 meters from a fence. The station is marked according to note 8,[1] except there is no surface mark. Three stakes around the station have the following magnetic bearings and distances: north 1.83 meters, east 1.83 meters, and south 1.89 meters.

Cowlitz (Cowlitz County, Wash., C. R., 1873). On the northwest side of the Columbia River at the mouth of the Cowlitz River, opposite Rainier, and 4 meters from the edge of the bank. The station is marked according to note 8,[1] except there is no surface mark. Three stakes around the station bear north, south, and east magnetic, distant 1.83 meters.

Cottonwood Island (Cowlitz County, Wash., C. R., 1873). About 1 mile east of the mouth of the Cowlitz River, on the lower end of Cottonwood Island, 20 meters from the north shore, and 30 meters from the south shore. The station is marked according to note 8,[1] except there is no surface mark. Three stakes were set bearing magnetic north, south, and east, distant 1.83 meters.

Bluff (U. S. E.) (Cowlitz County, Wash., U. S. E., 1912). On a bluff 10 meters south from the northwest corner of a powder house. The station is marked by a pipe driven in the ground.

Bend (U. S. E.) (Columbia County, U. S. E., 1912). On Deer Island Point, 27 meters inside the high-water line, and 24 meters from the willows and brush. The station is marked according to note 1.[1]

H 24 (U. S. E.) (Columbia County, U. S. E., 1912). The station is 106.7 meters southwesterly from the high-water line, back in the bushes, and is marked according to note 1.[1]

Old Orchard (Columbia County, C. R., 1878). On a bluff sandy bank on the south end of Deer Island, 9 meters from the shore, about 200 meters above a house. The station is marked according to note 8,[1] with the addition of a plank placed 6 inches above the underground mark, with a hole bored in it to mark the station. There are 3 stubs, with a copper tack in the top of each, distant 1.83 meters.

Maxwell (Cowlitz County, Wash., C. R., 1878). About 7 meters from the edge of a low bank, 60 meters southeast of the wharf at Maxwells Landing. The station is marked according to note 8.[1] Three stakes were set around the station, as follows: South, 1.86 meters, north and east, each 1.83 meters.

Adams (Columbia County, C. R., 1878). About three-fourths mile below Columbia City, on a gravelly bank between the county road and the shore, about 45 meters from the shore and 9 meters east of the road, directly opposite Maxwells Landing, and 60 feet above the river level. The station is marked according to note 8.[1] Three cedar stakes are set as follows: North, 1.86 meters, east, 1.83 meters, and south, 1.80 meters. Three copper tacks in a blazed fir tree bear N. 8° 53′ E. magnetic, distant 5.5 meters.

Carruthers (Cowlitz County, Wash., C. R., 1878). On a small point of hard clay a short distance above St. Helens. The station is marked according to note 8.[1] Three stakes were set as follows: North, 1.83 meters, east, 1.93 meters, and south, 1.83 meters.

Lemont (Columbia County, C. R., 1878). About one-half mile below St. Helens, on top of a cliff of nearly bare rock, 5.8 meters from the edge, on a small knoll. The station is marked by a drill hole, filled with lead, in the solid rock. Three copper tacks in a triangular blaze on a fir tree bear N. 32° W. magnetic, distant 42.55 meters, and a similar mark on a fir tree bears S. 25° W. magnetic, distant 53.37 meters.

Balsam (Cowlitz County, Wash., C. R., 1878). On the east bank of the Columbia River opposite St. Helens, on a low shore 16 meters from the edge of the water, and 30 meters north of a small creek. The station is marked according to note 8.[1] Three stakes were set as follows: North, 1.81 meters, east, 1.87 meters, and south, 1.81 meters. Three copper tacks in a triangular blaze on a balsam tree bear N. 73° E., distant 2.71 meters, and a similar mark on another balsam tree bears S. 53° E., distant 7.94 meters.

Russell (Cowlitz County, Wash., C. R., 1878). On the east side of the Columbia River, one-half mile below the mouth of the Lewis River, opposite Willamette Slough, on a sand ridge 4 meters from the shore. The station is marked according to note 8.[1] Three stakes were set as follows: North, 1.79 meters, east, 1.80 meters, and south, 1.83 meters. There are three copper tacks in a triangular blaze in a balm tree N. 30.5° E. distant 6.94 meters, and another tree marked in the same way bears S. 80° E., distant 6.82 meters.

[1] See pp. 81 and 82.

Warriors Point (Columbia County, C. R., 1878). On the extreme point of Warriors Point below the break in the bank and immediately in front of Mrs. Taylor's door. The station is marked according to note 8,[1] except that the underground mark is an earthenware bottle. There is a stub with a copper tack in the top, north and another south, both distant 1.83 meters, and one east, distant 1.80 meters.

Lake River (Clarke County, Wash., C. R., 1878). On a low island between Lake and Lewis Rivers, nearly opposite Warriors Point. The station is marked according to note 8.[1] Three fir stakes were set as follows: North, 1.84 meters, east, 1.84 meters, and south, 1.86 meters. Three copper tacks in a triangular blaze on a cottonwood tree bear S. 20° 08′ W. magnetic, distant 5.64 meters, and a similar mark on another large cottonwood tree bears S. 76° 40′ W. magnetic, distant 4.60 meters.

Shobert (Clarke County, Wash., C. R., 1881). On the east side of Lake River, about 275 meters southeast of Quigleys Landing, on top of a bank 60 feet above the water. The station is marked according to note 8.[1] There are three stakes around the station, as follows: North, 2.36 meters, east, 2.29 meters, and south, 2.13 meters. Three copper tacks in a fir-tree stump bear N. 38° E. magnetic, distant 9.97 meters, and a similar mark on another fir stump bears west magnetic, distant 6.4 meters.

Ladd (Clarke County, Wash., C. R., 1881). In the interior of Bachelor Island, on the first ridge east of a large lake or pond, 16 meters south of an old cattle shed and 120 meters north of a line fence. The station is marked according to note 8.[1] There are 3 cedar stubs around the station as follows: North 1.77 meters, south 1.89 meters, and east 1.73 meters.

Meadows (Columbia County, C. R., 1881). About one-half mile above Mr. Saline's place, on a narrow grass-covered ridge between the slough and swamp, about 100 meters from the shore and 50 meters from the edge of the timber, 16 meters south of a bunch of hard hack and 35 meters north of another bunch. The station is marked according to note 8.[1] There are 3 cedar stubs around the station, as follows: North 1.81 meters, south 1.88 meters, and east 1.84 meters.

Four 2 (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912). In a small field 21 meters inside the high-water line and 2.4 meters west of a rail fence. The station is marked according to note 1.[1] There is a double cottonwood tree with a nail in a blaze and 2 notches on the tree distant 54.25 meters.

Abrams (Clarke County, Wash., C. R., 1881). On the east side of Lake River about 1½ miles above Quigleys Landing, on a steep side hill just north of a small gulch, about 45 meters southeast of a group of 3 fir trees. The station is marked according to note 8.[1] There are 3 cedar stubs around the station as follows: North 1.83 meters, east 1.96 meters, and south 1.94 meters. There is a triangular blaze on a small oak tree distant 13.33 meters, and a similar mark on a maple tree distant 12.19 meters.

Fales house, red chimney (Clarke County, Wash., C. R., 1881). This is a false chimney of wood, painted bright red.

Nelson (Columbia County, C. R., 1881). On the west side of Willamette Slough, nearly opposite the southern end of Wests Island, 122 meters west of the shore line and the same distance east of the shore of a long narrow pond. The station is marked according to note 8.[1] There are 3 cedar stakes around the station, as follows: North 1.85 meters, south 1.85 meters, and east 1.83 meters.

Cloniger (Multnomah County, C. R., 1881). About 50 meters from the west bank of Willamette Slough on the farm belonging to Mr. Cloniger and 172 paces northeast of his house. The station is marked according to note 8.[1] There were 3 cedar stakes set as follows: North 1.88 meters, south 1.86 meters, and east 1.85 meters.

Knapp (Clarke County, Wash., C. R., 1881). A short distance below Knapps Landing in an open pasture, 26 meters from the shore line. The station is marked according to note 8.[1] There are 3 cedar stakes set as follows: North 1.83 meters, south 1.92 meters, and east 1.82 meters. There is also a cedar stake in an old fence line S. 89° E. magnetic, distant 28.002 meters, and a triangular blaze on a cottonwood tree W. 23° E. magnetic, distant 29.99 meters.

Sherringhousen (Multnomah County, C. R., 1878). On the northwest bank of Willamette Slough about one-half mile below Gosas Landing, 60 meters below Mr. Sherringhousen's hay barn and 7 meters from the edge of the bank. The station is marked according to note 8,[1] except there are two bottles lying on their sides instead of three. Three cedar stakes were set, one each north, east, and south, distant 1.83 meters.

Brookside (Clarke County, Wash., C. R., 1881). On top of a bluff hill on the east side of Lake River, nearly opposite the mouth of Salmon Creek, about 1 mile south of Mr. Knapp's ranch, about 75 meters north of a good stream of water and 150 feet above the river level. The station is marked according to note 8,[1] except only one bottle was buried, pointing to the station, and it is east about 1.8 meters. There are 3 cedar stubs around the station as follows: North 1.85 meters, east 1.80 meters, and south 1.85 meters.

Oak Ridge (Multnomah County, C. R., 1881). In open pasture land on the west side of Oak Island, which is on the west side of Sturgeon Lake in the interior of Sauvies Island nearly opposite Gosas Landing on Willamette Slough. The station is marked according to note 8.[1] There are 3 cedar stakes, as follows: North 1.85 meters, south 1.81 meters, and east 1.85 meters.

Harris (Clarke County, Wash., C. R., 1881). On the east bank of the Columbia River back 34 meters and nearly opposite the landing at Reeder's farm on Sauvies Island, 4 meters south of a fence running back from the shore, 14 meters west of a fence parallel with the shore, and 60 meters from the wooded swamp. The station is marked according to note 8.[1] There are 3 cedar stakes, one each north, south, and east of the station, distant 1.83 meters.

Morgan (Multnomah County, C. R., 1881). On Sauvies Island, on the lower end of the land owned by Mr. Morgan, in a cultivated field 12 meters from the river bank. The station is marked according to note 8,[1] except there is no surface

[1] See pp. 81 and 82.

mark. There are 3 cedar stakes around the station, as follows: North 1.90 meters, south 1.85 meters, and east 1.83 meters; also 3 nails in a blazed cottonwood tree, distant 3.05 meters. A small house by the river bears N. 34° W. magnetic, distant 58 meters and a corner of a barn bears S. 11° W. magnetic, distant 68 meters.

Hendrickson (Clarke County, Wash., C. R., 1881). About 12 meters back from the east bank of the Columbia River, just below Hendrickson Point and exactly opposite the mouth of the Willamette River. The station is marked according to note 8.[1] There are 3 cedar stakes around the station, as follows: North 1.86 meters, south 1.90 meters, and east 1. 83 meters, and a triangular blaze on a cottonwood tree N. 29° E. magnetic, distant 12.26 meters.

Howell house, east chimney (Multnomah County, C. R., 1881). About 2 miles above the mouth of the Willamette River on Sauvies Island.

Hillside (Multnomah County, C. R., 1883). On the west side of Willamette Slough, about 1½ miles below the head of Sauvies Island, on a bare hillside, about 75 feet above the bottom lands and 55 feet above the county road. The station is marked according to note 8.[1]

Quigley (Multnomah County, C. R., 1883). On the brow of a rather steep hillside, about 150 feet above the bottom lands. The ground back of the station forms a gently sloping bench up the hill. The station is marked according to note 8.[1] There are three cedar stakes around the station, as follows: North 1.86 meters, east 1.83 meters, and south 1.89 meters.

Thistle (Multnomah County, C. R., 1882; 1883). On the west bank of the Willamette River, about 6½ miles from Portland, 15.54 meters from a fence on west side of the Portland-St. Helens road. The station is marked according to note 8.[1] There are three cedar stakes around the station, as follows: North 1.91 meters, west 1.86 meters, and east 1.83 meters.

Mann (Multnomah County, C. R., 1883). On the west side of the Willamette River, 5½ miles below Portland, on sloping ground 30 meters west of the Portland-St. Helens road, and 40 feet above the ordinary river level. The station is marked according to note 8.[1] There are three cedar stakes around the station, as follows: North 1.87 meters, west 1.90 meters, and east 1.83 meters.

Homestead (Multnomah County, C. R., 1883).—Lost.

Crest (Multnomah County, E. E. S., 1913). The station is the flagpole in the center of the observation tower on the highest point in the well-known Council Crest Park, at an elevation of about 1100 feet. The tower is about 40 feet square.

Mills (Multnomah County, E. E. S., 1913). It is the spire of the water tank of the Oregon Planing Mills, near the river, in the northern part of Portland, between Nineteenth and Twentieth Streets and between Vaughn Street and the railroad, about 32 paces from Vaughn Street and 47 paces from Nineteenth Street. The stand is of reinforced concrete, with a platform offering ample room and steady support for a theodolite. The tank is 23.04 meters in circumference.

Federal east wireless (Multnomah County, E. E. S., 1913). The eastern one of the two towers in Lents, about 6 miles southeast of Portland, on a lot at the intersection of the O. W. P. R. R. and Main Street. The towers are 146 meters apart and stand in an east and west line perpendicular to Main Street; the western and nearer one is distant 68.6 meters from Main Street at a point 47.5 meters south of the railroad. The towers are 2 meters square, painted white, and 312 feet high.

Federal west wireless (Multnomah County, E. E. S., 1913). The western one of the two towers described above under Federal east wireless.

Y. M. C. A. east wireless (Multnomah County, E. E. S., 1913). A light steel tower surmounted by a mast on the Y. M. C. A. building, which occupies the end of a block on Taylor Street between Sixth and Seventh Streets. The station is 2.5 meters distant from Sixth Street and 11.1 meters from Taylor Street.

Y. M. C. A. west wireless (Multnomah County, E. E. S., 1913). A light steel tower surmounted by a mast on the Y. M. C. A. building, which occupies the end of the block on Taylor Street between Sixth and Seventh Streets. The station is about 2.5 meters distant from Seventh Street and 13.51 meters from Taylor Street.

COLUMBIA RIVER FROM THE MOUTH OF THE WILLAMETTE RIVER TO CASCADE LOCKS.

PRINCIPAL POINTS.

Shaw (Multnomah County, C. R., 1889). About 35 meters from the head of Haydens Island, 10 meters from the north bank. The station is marked according to note 8.[1] There are three cedar stubs with copper tacks in the tops, as follows: West 1.83 meters, east 1.86 meters, and south 3.67 meters. There are three copper tacks in a blazed balm tree distant 4.83 meters.

Stansbury (Multnomah County, C. R., 1889). About one-half mile east of the Portland & Vancouver Railroad, 180 meters south of the county road, and about 6 meters from the brow of the hill. The station is marked according to note 8,[1] except the surface mark is a section of the center pole. There are three stubs marked with copper tacks—north, south, and east—distant 1.83 meters.

Wintler (Clarke County, Wash., C. R., 1889; 1900). About 3½ miles above Vancouver, on a side hill, on uncultivated land, 30 meters north of the county road, in a growth of small fir trees. The station is marked according to note 8.[1] Stakes with copper tacks in the top were placed 1.83 meters south, east, and west of the station. There is a triangular blaze on a large tree distant 3.70 meters in azimuth 4° magnetic, and a small fir tree with a similar mark distant 7.50 meters in azimuth 84.5° magnetic.

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[1] See pp. 81 and 82.

Lower Point (Multnomah County, C. R., 1889). Lost, 1891.

Hexter (Clarke County, Wash., C. R., 1889, 1900). Just east of a road which runs north from the county road and in the back yard of a house owned by Mr. Isaac F. Fletcher. The station is marked by a hole in a brick 2 feet below the surface and at the surface by a hole in a stone. The following azimuths are given: North gable of barn across river, 41° 57′ 31″; chimney Phipps house, 97° 40′ 31″; chimney J. M. French's house, 138° 16′ 51″; cupola Moseley's house, 274° 24′ 21″.

Jungle (Multnomah County, C. R., 1889). Lost, 1900.

Quartermasters wharf (Clarke County, Wash., C. R., 1889). On the upper wharf of the Vancouver Barracks and is marked by a copper nail with 4 others around it. It is 3.96 meters north of the edge of the wharf, 6.34 meters east of the edge, and 6.55 meters west of the edge. The station is probably lost.

Rauer (Multnomah County, C. R., 1889). About 1½ miles below Vancouver, on an island lying abreast of Haydens Island, 4.5 meters from the edge of a vertical bank. The station is marked according to note 8,[1] except the surface mark is a section of the pole projecting 8 inches from the ground. There are 3 stubs around the station, east, west, and south, respectively, distant 1.83 meters.

Sisters Farm (Clarke County, Wash., C. R., 1889). About 1½ miles below Vancouver, close to the edge of the river bank, in a public road, opposite the lower end of a double row of piles, and 24 meters above the house belonging to the Sisters of Providence Academy. The station is marked according to note 8,[1] except the underground mark is a cross on a flat stone. There are 3 stubs with copper tacks in them, each 1.83 meters from the station, one east, one west, and one south.

Allman (Clarke County, Wash., C. R., 1889). About 3 miles below Vancouver, 13 meters north of the river bank. The station is marked according to note 8.[1] There are 3 stubs around the station, distant 1.83 meters, one each north, east, and west.

Hayden (Multnomah County, C. R., 1889). On the north shore of Hayden Island, about 1 mile above the west end. The station is marked according to note 8.[1] There are 3 cedar stubs around the station, distant 1.83 meters south, east, and west. There is a nail in a large blazed willow tree, distant 4.389 meters in azimuth 147° magnetic, and a nail in a small blazed willow tree, distant 4.072 meters in azimuth 259° magnetic.

Hood (Multnomah County, C. R., 1891; 1905). On the northern shore of Government Island, about 70 meters from the river shore. There are no trees within about 100 meters of the station. The station is marked by a rectangular cross on a flat stone 3 feet below the surface, and at the surface by a drill hole in a large basaltic rock around which there is a small pile of stones. The following azimuths are given: Chimney of yellow house across the river, 144° 40′ 47″; south gable Love's grist mill, 154° 36′ 57″; Fisher's Landing, schoolhouse cupola 251° 11′ 47″; west gable post office Fisher's Landing 258° 38′ 27″.

Prune Hill (Clarke County, Wash., C. R., 1891; 1905). Near the top of a hill, which is clear of timber and covered with grass, 36 meters southwest of an unoccupied house, and about 100 and 150 meters from two fir trees, the tops of which are in range with the station. The station is marked according to note 8.[1]

Mays (Multnomah County, C. R., 1891). Lost.

Taggarts Bluff (Multnomah County, C. R., 1891; 1901). Nearly abreast of the eastern end of Government Island, near the edge of a sandstone cliff which is the river bank, about 40 meters east of the highest point. The station is marked according to note 8,[1] except that the three bottles were not placed around the station. There is a drill hole filled with lead in the side of a large bowlder facing the station, distant 2.62 meters in azimuth 289°.

Fisher (Clarke County, Wash., C. R., 1891; 1900). About one-fourth mile west of the wharf at Fishers Landing, 45 meters from the foot of a hill which is covered with bowlders and underbrush, 192 meters west of a brook, and 153 meters east of a fence at the edge of the forest, and 11 meters back from the river shore. The station is marked by a puncture at the intersection of the cross lines on a stone buried 3 feet below the surface and at the surface by a drill hole filled with lead in a large basaltic rock. Flat stones with arrows scratched on them were buried 1 foot under the ground at equal angles around the station distant 1.83 meters. The following distances and azimuths from magnetic south are given: Blaze on a cottonwood stump distant 11.38 meters 27° 44′, small blackwood tree distant 52.21 meters 137° 47′, blazed willow tree distant 51.51 meters 266° 49′, and highest point of large bowlder distant 41.03 meters 201° 16′.

Harlow (Multnomah County, C. R., 1891; 1905). Opposite the village of Troutdale on the extreme point on top of the high pinnacle of rocks at the summit of the bluffs. The station is marked according to note 8,[1] except that the three bottles around the station are omitted. In the group of rocks to the westward there are two small drill holes filled with lead in the face of the rocks toward the station; one is distant 2.079 meters in azimuth 260° magnetic and the other is distant 2.242 meters in azimuth 186° magnetic.

Daniels (Clarke County, Wash., C. R., 1891; 1905). On top of the high land known as Prune Hill, nearly abreast of the lower end of Ladys Island just east of a prune orchard, about 6 meters from the fence. Four stakes with copper tacks in the tops were set north, south, east, and west of the station, distant 1.83 meters. The station is marked according to note 8.[1]

Washougal (Clarke County, Wash., C. R., 1891; 1901). In a cultivated field in front of Granger's store, about 82 meters south of the main road. The station is marked by a bottle with a copper tack in the cork, buried 3 feet, and at the surface by a drill hole, filled with lead, in a large stone. The following azimuths are magnetic: Old Washougal Hall flagstaff, 73° 38′; Surber's house chimney, 131° 22′; Granger's store, middle of door, 154° 57′; schoolhouse cupola, 220° 18′; large oak, distant 300 meters 264° 51′; and crotch of a small double oak distant about 150 meters 304° 43′.

[1] See pp. 81 and 82.

Eagles Bluff (Multnomah County, C. R., 1891; 1900). About 1¼ miles east of the Sandy River, about 156 feet above the level of the river on the west corner of a nearly level bench of land on a round projecting point on the hillside above the tracks of the Oregon Railroad & Navigation Co. and back of the second reverse curve east of Sandy Creek. The station is marked according to note 8,[1] except that the three bottles around the station were omitted. The reference marks are drill holes filled with lead in rocks; one is distant 2.40 meters in azimuth 65° magnetic and the other is distant 1.95 meters in azimuth 111° magnetic.

Mount Pleasant (Clarke County, Wash., C. R., 1891). Just below Cape Horn and nearly opposite Rooster Rock, on a level bench of the ridge overlooking Canyon Creek. The station is marked according to note 8.[1] The following magnetic azimuths are given: Lawton's house 56° 24′, Sampson's house 58° 30′, Rooster Rock 133° 53′, Tunnel Rock 181° 55′, Rocky Butte 245° 12′.

Remington (Clarke County, Wash., C. R., 1891). The station is marked by a bottle buried 3 feet below the surface.

Government Island (Multnomah County, C. R., 1891).—Lost, 1901.

Quarry (Clarke County, Wash., C. R., 1891; 1901). About 1½ miles above Fishers Landing, on a slope of the hill, 20 meters south of the road and 40 meters from the river bank, 200 meters east of Muirhard's house, and 18 meters from the edge of a small quarry. The station is marked by a drill hole in the solid rock.

Ladys Island (Clarke County, Wash., C. R., 1891; 1900). On the upper end of Ladys Island opposite the village of La Camas, on a level spot a little south of the highest point of a ledge of rocks, 150 meters from the eastern point, and 40 meters from the south side. The station is marked by rectangular cross lines on a flat rock 3 feet below the surface, and at the surface by a drill hole in a large bowlder nearly level with the surface.

Brush (Multnomah County, F. M., 1901). On the northeast point of a ridge on a high hill about 1½ miles below Corbett station. A level bench was graded for the signal and this is probably the best indication of the general locality. The station is marked by a wide-mouthed bottle with a glass top secured by a metal screw set 2 feet below the surface. There are 3 witness stubs with copper tacks distant 1.83 meters east, west, and south of the station.

Cliff (Multnomah County, F. M., 1901). On the northeast brush-covered slope about 20 meters from the top of the high rocky cliff back of Rooster Rock, about 20 feet below the top of the cliff. A bench was graded out of the side hill for the signal and this is probably the best guide to the location of the station. The station is marked by a drill hole in a flat stone rounded underside, buried 2 feet below the surface. There are stubs each marked with a copper tack distant 1.83 meters east, west, and south. The following azimuths are given: Tree Cape Horn 228° 55′, Rock mid-river 233° 37′, Castle Rock 240° 37′, sawmill smokestack 264° 39′, Rooster Rock 130° 48′.

Grout (Clarke County, Wash., F. M., 1901). On top of the bluff on Mount Pleasant, on the farm of F. H. Grout about 40 meters east of the fence between the Grout and Sampson farms. The station is marked by a drill hole in a round stone 10 inches in diameter buried 2 feet. There is a cross on the side of a stone facing the station, distant 2.62 meters S. 88° 15′ E. magnetic, a similar mark distant 4.965 meters S. 29° 55′ E. magnetic, and a cross on the top of a stone, distant 1.640 meters N. 55° 00′ W. magnetic.

Shepard (Multnomah County, F. M., 1901). At the edge of a prominent rocky bluff about a mile west of Bridal Veil. The station is marked by a drill hole in the rock at the bottom of a crevice some 4 inches below the surface. Three fir trees are blazed; the first is a small tree on the edge of the bluff distant 3.87 meters, the second tree is 12 inches in diameter and marked with two blazes distant 19.29 meters, and the third is about 14 inches in diameter blazed and marked with a triangle of nails and the letters "U. S. C. S." in tacks distant 33.34 meters. The following azimuths are given: Rooster Rock 84° 47′ 09″, tree on high rock 227° 30′ 50″, rock in mid-river 210° 46′ 02″, and Cape Horn tree 174° 13′ 23″.

Mount Zion (Skamania County, Wash., F. M., 1901). On a cone-shaped hill, about 1 mile back from Cape Horn, not on the highest part of the hill but a short distance down the southeast slope. The station is marked by a hole drilled in a stone buried 2 feet, and at the surface is a larger stone with a drill hole 1 inch deep. There are three dead trees blazed, one distant 5.3 meters N. 39° E. magnetic, one distant 11.2 meters S. 44° E. magnetic, and one 11.2 meters S. 15° W. magnetic.

Angel (Multnomah County, F. M., 1901). On a rocky bench, on the crest or backbone of a low brushy ridge, about 1 mile east of Bridal Veil, 400 meters back of a long, low point making out into the river, about 200 meters southeast of the house on Mr. Dalton's place. Back of the station is a prominent bluff called Angel's Rest. The station is marked by a drill hole in the sloping face of the solid rock about 4 inches below the surface. There are 3 reference marks, drill holes in outcropping rock, the distances and magnetic azimuths of which are given; distant 0.85 meter 194° 00′, distant 3.89 meters 4° 40′, and distant 1.46 meters 68° 00′.

Twin Mountain (Skamania County, Wash., F. M., 1901). On the backbone of the brushy ridge leading up to Twin Mountain, about 50 meters above a bare rounded rocky knob. The location is probably best indicated by a level bench that was dug out of the hillside for the signal. The station is marked by a drill hole in a stone buried 1 foot. There is a trunk of a dead fir tree 2½ feet in diameter blazed with three nails driven in it, distant 7.3 meters N. 33° 18′ E. magnetic, a drill hole in an outcropping rock, distant 3.71 meters N. 6° 36′ E. magnetic, and a drill in another rock outcrop distant 3.26 meters N. 49° 43′ W. magnetic. The following magnetic azimuths are given: Castle Rock 230° 00′, top of Multnomah Falls 287° 16′, high falls west of Multnomah 307° 45′, rock in mid-river 20° 20′.

Railroad (Multnomah County, F. M., 1901). On the north side of the Oregon Railroad & Navigation Company's tracks within the right of way about three-fourths mile east of the 30 mile post, and on a narrow bank about 12 feet above the track. The station is marked by a drill hole in a stone 1 foot below the surface. Two trees are blazed with

[1] See pp. 81 and 82.

nails driven into them, one distant 49.04 meters S. 21° 33′ W. magnetic and the other distant 20.18 meters N. 47° 19′ W. magnetic.

Oneonta (Multnomah County, F. M., 1901). On a rocky bluff on the west side of Oneonta Gorge. A lone rock in the middle of the river is seen over the outer edge of the cottonwood tree on the first prominent point above Multnomah Falls. The station is marked by a wide mouthed jelly bottle 1 foot below the surface, over which for a surface mark is a stone about 15 inches square with a drill hole in the top. The reference marks are drill holes in rocks, one distant 1.07 meters N. 8° 03′ E. magnetic and has the drill hole on the side toward the station, the second is distant 2.51 meters S. 24° 42′ E. magnetic and has the drill hole on top, the third has the drill hole on top and is close to the edge of the precipice distant 3.17 meters S. 57° 25′ W. magnetic.

Bluff (Skamania County, Wash., F. M., 1901). On the crest of the brushy ridge below the high rocky bluff, opposite the railroad section house at Oneonta, about 100 meters from the talus that has fallen from the cliff. The station is marked by a drill hole in a stone set about 4 inches below the surface. For reference marks there is a blazed stump of a small fir tree distant 5.55 meters N. 74° 46′ E. magnetic, a small fir tree blazed with 3 nails distant 16.31 meters S. 82° 34′ E. magnetic, a blazed fir tree distant 15.33 meters N. 34° 50′ W. magnetic.

Lookout (Skamania County, Wash., F. M., 1901). On a brush covered rounded hill, on a shoulder overlooking the river and Mr. Graaff's residence, directly back of Butlers Landing. The station is marked by a drill hole in a rock 3 or 4 inches below the surface. For reference marks there are 3 drill holes in rocks with the following distances and magnetic bearings: distant 3.57 meters S. 71° 07′ E., distant 3.96 meters S. 1° 05′ W., distant 2.71 meters S. 25° 41′ W.

Dodson (Multnomah County, F. M., 1901). At Dodsons siding on the Oregon Railroad & Navagation Co.'s tracks, about one-half mile above McGowans Cannery, 65.8 meters west of the post marked Dodson's, and 7.86 meters from the north rail of the track. The station is marked by a drill hole in a stone 15 inches below the surface. There are three drill holes in rocks for reference marks, the first is distant 2.12 meters S. 73° 25′ E. magnetic, the second is distant 1.97 meters S. 25° 55′ W. magnetic, and the third is distant 1.69 meters N. 57° 34′ W. magnetic.

Warren (Multnomah County, F. M., 1901). On the north side of the Oregon Railroad & Navigation Co.'s tracks, about 150 meters east of Gorman's large barn and about the same distance west of Dodson's store, and 8.17 meters from the north rail of the track. The station is marked 1½ feet below the ground by a stone with a hole drilled in it, and at the surface by a drill hole in a larger stone. There is a triangle of copper tacks on a telephone pole distant 6.288 meters S. 82° 05′ E. magnetic, a fence post with a similar mark is distant 9.42 meters N. 75° 29′ W. magnetic, and a second fence post with a similar mark distant 5.96 meters N. 9° 15′ W. magnetic.

Climb (Skamania County, Wash., F. M., 1901). On the shoulder of a high rocky bluff on a mountain about due north of Castle Rock. As you climb the ridge above the timber a small shoulder will be reached that gives the first view of the river but the station is on the larger shoulder about 100 feet above. The station is marked by a hole drilled in a small stone surrounded by a triangle buried 10 inches below the surface. There are 3 small stones with crosses cut on them set 1.83 meters from the station, two are on the crest of the ridge one above and one below the station and the other is down the slope on the east side.

Bonneville (Multnomah County, F. M., 1901). On the west side of Tanner Creek, on a steep side hill about 100 meters below the rocky cliff under Potato Hill. A level bench was dug in the side hill for the station. The station is marked by a drill hole in a stone level with the surface of the ground. There is a blazed tree distant 2.04 meters S. 40° 27′ E. magnetic and a similar mark distant 2.19 meters S. 0° 22′ W. magnetic.

Aldrich (Skamania County, Wash., F. M., 1901). On the summit of a sharp peak directly opposite Bonneville. The station is marked 1 foot underground by a drill hole in a stone. There are three stones with crosses on them 1.83 meters from the station north, east, and south.

Moffat (Skamania County, Wash., F. M., 1901). On the highest point of a comparatively low, bare rocky hill about west of the Cascade Locks, about one-quarter mile from the lake. The station is marked by a drill hole in a stone set 3 or 4 inches below the surface. There is a blazed fir tree 10 inches in diameter distant 19.11 meters N. 46° 34′ E. magnetic, and a similar mark on a fir tree 2 feet in diameter distant 9.69 meters S. 52° 59′ E. magnetic.

Cascade (Hood River County, F. M., 1901). On the summit of a sharp rocky hill directly back or southeast of the Cascade Locks. The station is on the hill nearest town and the one farthest west of the four hills in this locality. The station is marked by a drill hole in a rock surrounded by a triangle, set about 6 inches below the surface. There is a blazed stump of a fir tree distant 2.00 meters N. 26° 40′ W. magnetic, and a blazed fir tree about 4 inches in diameter distant 21.12 meters S. 7° 49′ W. magnetic. The following magnetic azimuths are given: southwest end of the rocky bluff near the lake 197° 44′, higher of the two hills back of the station 285° 57′, right tangent to the little island above Bradfords Island 44° 37′, Cascade fish wheel 99° 00′.

End (Hood River County, F. M., 1901). On the top of a bluff at the west end of a rocky hill which is nearly surrounded by a pond or slough, about 3 miles above the Cascade Locks. The station is marked by a drill hole in solid rock covered with a thin coating of soil, over which is a pile of rocks. There is a blazed oak 12 inches in diameter standing near the edge of the precipice distant 20.24 meters N. 25° 21′ E. magnetic, a blazed oak tree 18 inches in diameter standing back from the edge in a thicket of small oaks distant 19.29 meters N. 46° 19′ E. magnetic, and a small scrub oak at the edge of the thicket distant 10.52 meters S. 78° 13′ E. magnetic.

Stackhouse (Skamania County, Wash., F. M., 1901). On the hillside above the ranch house of Mr. Nix and below that of Mr. Stackhouse, about 1½ miles above Stevenson. The station is marked by a hole drilled in a stone 18 inches below the surface. There are 3 blazed fir trees with nails driven in them, the first is distant 18.212 meters N. 56° 00′ E.

magnetic, the second is distant 7.961 meters S. 7° 01′ W. magnetic. and the third is distant 11.506 meters S. 50° 21′ W. magnetic.

Bradford (Multnomah County, F. M., 1901). On the point of a high rocky precipice on the west slope and near the brink, about opposite the upper end of Bradfords Island. A bench was excavated in the steep sidehill for the signal. The station is marked by a drill hole in a rock set level with the surface. There is a blazed fir tree 18 inches in diameter on the crest of the ridge at the edge of the precipice distant 4.14 meters N. 30° 03′ E. magnetic, a similar tree and mark distant 10.27 meters S. 62° 34′ E. magnetic, and a small blazed oak on the west side of the slope distant 7.78 meters S. 15° 43′ E. magnetic.

Locks (Hood River County, F. M., 1901). Near the curve of the retaining wall on the eastern side of the upper entrance to the Cascade Locks. The station is marked by a stone with a hole drilled in it, placed 18 inches underground. There are three crosses cut in the top layer of the riprapping of the retaining wall; the first is distant 7.10 meters N. 57° 05′ E. magnetic, the second is distant 4.82 meters S. 82° 51′ W. magnetic, and the third is distant 6.17 meters N. 21° 21′ W. magnetic.

SUPPLEMENTARY POINTS.

Headquarters flagstaff, Vancouver (Clarke County, Wash., C. R., 1881). Masthead of the flagstaff in front of the barracks to the east of the headquarters building.

Garrison flagstaff, Vancouver (Clarke County, Wash., C. R., 1881). Masthead of the flagstaff which stands near the center of the parade grounds in the garrison.

Stenger (Clarke County, Wash., C. R., 1889; 1900). About 4½ miles above Vancouver on property owned by Mr. Stenger. About 30 meters northeast of a clay pit which was being extended in 1900 so that the station would be destroyed in about 2 years. The station is marked according to note 8.[1]

Fishers Wharf, southeast pile (Multnomah County, C. R., 1891; 1900). It is the southeast or upper corner pile of Fishers Wharf. It was whitewashed and used as a hydrographic signal.

Bartlett's barn, north gable (Multnomah County, C. R., 1891). Near the north shore of Government Island, about 1½ miles above Fishers Landing, Wash., on Mr. Bartlett's dairy farm.

Gibbons Creek (Clarke County, Wash., C. R., 1891; 1900). About 2½ miles east of Washougal, one-fourth mile south of the county road, 32 meters west of Gibbons Creek, 29 meters north of two immense cottonwood trees, and 52 meters south of a long line fence inclosing the pasture lands. The station is marked according to note 8[1] with the exception that there is no surface mark except a portion of the center pole which was left in the ground.

Williams (Multnomah County, C. R., 1891; 1900). About 1 mile below Vans Landing, in a peach orchard on a steep hillside, about 40 meters S. 50° W. magnetic of John Williams's house, close to the edge of the bushes, and about 85 feet above the level of the river. The station is marked by a bottle 3 feet below the surface. There are three copper tacks in a large stump distant 4.2 meters S. 84° 37′ E. magnetic. The following azimuths are given: Sandhill fir tree 354° 20′ 33″, Sampson's house west gable 237° 13′ 03″, Washougal Hall 327° 03′ 13″, wharf house south gable 328° 13′ 28″.

Corbett (Multnomah County, F. M., 1901). On the sharp ridge of the first little point about 100 meters east of Corbett's railroad station. The station is marked by a drill hole in a stone 2½ feet below the surface. There is a blazed fir tree distant 7.28 meters in azimuth 271° 10′ magnetic, a fir tree with a similar mark distant 6.22 meters in azimuth 345° 30′ magnetic, and a stump with three nails in it distant 3.66 meters in azimuth 225° 34′ magnetic.

THE SECONDARY TRIANGULATION.

PRINCIPAL POINTS.

Roman (Douglas County, O. B. F., 1903; 1908). On the most westerly of the two summits of the highest peak of the Coast Range, known as Roman Nose or Saddle Mountain, situated near the north line of Douglas County about 5 miles southwest of the junction of Wild Cat Creek with the Siuslaw River. It is on the highest point of the summit, about 6 feet from the southern edge of the bluff and 20 feet from the steep part of the slope south of the station. The peak is bare except for a few low shrubs, and has a steep bluff on the south side, and a gentle grassy slope on the north side. The station is marked by ⅝-inch copper bolt 3 inches long cemented into a drill hole in a stone 12 by 12 by 24 inches, 18 inches below the surface, set with the axis east and west. The surface mark is an old-type station mark, which is a disk and shank cast in one piece. The disk is about 85 millimeters in diameter and has a polished center surrounded by the raised letters "U. S. C. & G. S." and a raised flange around the edge. This is set in a stone measuring about a foot on each side, with its top flush with the surface. The two reference marks are drill holes in the top of ⅝-inch copper bolts, one of which is leaded or cemented into a drill hole in the nearest outcropping of the solid rock 14.760 meters from the station in azimuth 148° 06′, and the other in a projecting bowlder 6.775 meters from the station in azimuth 205° 33′. Arrows pointing to the reference marks are cut in the rock near each mark. An old burned stump is about 5 feet from the station in azimuth 232°.

Mary (Benton County, O. B. F., 1903; 1908). On the highest point of the grassy summit of Mary Peak, about south-southwest from Corvallis. The station is marked by a three-eighths inch copper bolt cemented into a drill hole in a flat stone 4 inches thick and 19 inches in diameter, 22 inches below the surface. The surface mark is an old-type station mark which has a polished center surrounded by the raised letters "U. S. C. & G. S." and a raised flange around the edge. This is set in a bowlder 16 by 18 by 30 inches, the top of which is flush with the surface of the ground. The

[1] See pp. 81 and 82.

two reference marks are drill holes in the top of three-eighths inch copper bolts cemented in bowlders at the following distances and azimuths from the station: 13.77 meters, 326° 22′; and 29.36 meters, 58° 11′.

Table (Lincoln County, J. S. H., 1908). On a flat-topped mountain known locally as White Rock, southeast of Newport, between the Yaquina and Alsea Rivers, on a small knoll running north and south, about 90 meters southwest of the highest point of the southwest ridge, about 365 meters north of a prominent rocky bluff, and 60 meters north of the highest point of the southeast spur. The station is marked according to note 11.[1] One reference mark is distant 8.47 meters in azimuth 43° 43′, and the other 9.49 meters in azimuth 128° 29′.

Cummins (Lincoln County, J. S. H., 1908). On the highest part of the mountain, 20 miles south of Waldport by road and trail. The station is marked by a drill hole 1½ inches deep in a large rock set flush with the surface. One reference mark is a drill hole one-half inch deep in a natural rock projecting about 6 inches a little way down the slope in azimuth 120° 42′, and the other is a drill hole in a large bowlder at the south end of the summit in azimuth 33° 33′.

Foulweather (Lincoln County, J. S. H., 1908). A little west of the highest point on Cape Foulweather, about 10 miles north of Newport, in an opening in the timber which can be easily seen from the beach to the south. Two stands were erected from which to occupy this station so as to avoid cutting. The station is marked by a nail in the root of a tree. There is a drill hole one-third inch in diameter and one-half inch deep in a rock about 7 inches square, the top of which is placed 4 inches below the surface, distant 7.26 meters in azimuth about 138°.

Maple (Lane County, J. S. H., 1908). On the first hill about one-fourth mile south of Bald Mountain, on the highest part of the top, and in the center of the ridge. The station is marked according to note 11,[1] except the reference marks are drill holes without the brass bolts. One reference mark is distant 6.36 meters in azimuth 89° 19′, and the other is distant 8.02 meters in azimuth 346° 19′.

Fairview (Lane County, J. S. H., 1908). On the highest part of the mountain about 6 miles northeast of Heceta between Ten Mile Creek and Big Creek. The station is marked according to note 11.[1] One reference mark is distant 8.65 meters in azimuth 198° 01′, and the other is distant 8.21 meters in azimuth 257° 45.′

Cape (Lane County, J. S. H., 1908). On the mountain 13 miles by road and trail north of Florence, about 150 meters east of the timber, and 9 meters south of the highest point which is covered with large bowlders. The station is marked according to note 11.[1] One reference mark is on the largest bowlder on the point projecting 3 feet above the surface, north 9.44 meters, and the other is in a bowlder projecting about 1½ feet, east 8.17 meters.

Dean (Douglas County, J. S. H., 1908). On the north slope of the first prominent knoll about 275 meters east of the timbered summit known as Deer Head Point, about 15 or 18 meters from the highest part of the knoll. The station is marked by an inch drill hole in the center of a long, narrow rock buried 4 inches underground. For reference marks there are two trees with a nail in a triangular blaze; one is N. 23° E., distant 15.316 meters, and the other is S. 68° E., distant 14.249 meters. These bearings are probably magnetic.

Trail (Douglas County, J. S. H., 1908). On the trail between Gardiner and Florence in some very large timber about 5 miles from Gardiner, about 90 meters beyond a cabin which is passed on the right and close to the trail. The station and cabin are on the same side of the trail. The station was in the top of a tree 160 feet tall and was not marked on the ground. There are two reference marks; one is a drill hole in a rock 18 inches below the surface, over which is another rock with a drill hole 2 inches below the surface, distant 41.16 meters in azimuth 87° 15′, and the other reference mark is the same except the lower mark is buried 24 inches and the upper mark 8 inches, distant 37.18 meters in azimuth 181° 13′.

Schooner (Douglas County, J. S. H., 1908). On the south side of the Umpqua River, about three-fourths mile above Reed's cannery, in the timber on the side hill, 12 meters northeast of the highest part of the hill and about 400 feet above the river. The station is marked 14 inches below the surface by a drill hole in a 30-pound rock and 2 inches below the surface by a standard disk station mark set in a 35-pound rock. For reference marks there are three-eighths inch bolts driven into two large trees; one is distant 6.01 meters in azimuth 218° 52′ and the other is distant 16.12 meters in azimuth 303° 33′.

Burn (Douglas County, J. S. H., 1908). On top of a burnt ridge south of Gardiner, 11 meters southeast from the highest part of the hill. The station is marked according to note 11,[1] except there is only one reference mark and that is distant 10.79 meters in azimuth 76° 47′ 10.″

Bald (Lincoln County, J. S. H., 1908). On Rocky Point, which is a very sharp and prominent point one-fourth mile south-southwest of Bald Mountain summit. Here the ridge forms a horseshoe, Rocky Point being at the northwest end and Bald Mountain at the other. There is a trail at the foot of the point on the west side which goes over the top and within 15 meters of the station. There is a spring about 275 meters southwest and another one to the east. The station is marked by a standard disk station mark set in a large rock flush with the surface. There is a three-eighth inch drill hole at the intersection of cross lines between the letters "U. S.," on the most western prominent shelf of natural rock distant 9.25 meters in azimuth 181° 21′, and a three-eighth inch drill hole at the intersection of three cross lines on top of a large natural bowlder projecting 1 foot on the southwest face of which are the letters "U. S." inverted, distant 3.24 meters in azimuth 20° 14′.

Iron (Lincoln County, J. S. H., 1908). On a prominent cone-shaped hill about 1½ miles north of Yaquina Lighthouse, 4.5 meters north of the extreme high point. The hill is timbered about halfway up and the last 100 meters is very steep and covered with loose stones. The station is marked by a standard disk station mark cemented in the natural rock. For one reference mark there is a drill hole in an outcrop of rock distant 8.195 meters in azimuth 95°

[1] See pp. 81 and 82.

FIG. 4.—STATION CAPE SHOWING THE OBSERVING TOWER WITH THE WIND SHIELD.

19′, and the other is a drill hole in the north end of a quite prominent ledge of rock which lies on the backbone of the ridge which extends northward from the summit, distant 18.260 meters in azimuth 172° 24′.

Cascade (Tillamook County, J. S. H., 1908). On the side hill of the southeast ridge of the Cascade Mountain, about 30 meters from the east edge of the timber and 45 meters east-southeast from the top of the first spur. An opening cut through the timber to the north should help to identify the location. The station is marked 2 feet underground by a drill hole at the intersection of cross lines on a flat stone and at the surface by a standard disk station mark set in the end of a large rock. There are four blazed trees marked with nails, as follows: Distant 70.4 meters in azimuth 35° 34′ distant 24.8 meters in azimuth 56° 07′, distant 40.6 meters in azimuth 191° 40′, and distant 43.0 meters in azimuth 288° 11′.

Salmon (Lincoln County, J. S. H., 1908). About 6 miles by road and trail southwest of Otis post office on the highest fern-covered hill on the south side of the entrance to the Salmon River, on top of a ridge 1.5 meters across, 27 meters south of the highest point, and directly in the center of the trail. The station is marked by a bolt 1 inch in diameter set in the top of a large rock flush with the surface. The reference marks are 1-inch drill holes one-half inch deep in natural rocks on the hillside; one is distant 3.40 meters in azimuth 85° 54′ and the other is distant 2.00 meters in azimuth 149° 37′.

Tillamook Head (Clatsop County, J. J. G., 1874). On the highest point of Tillamook Head, near a large, dry hemlock stump with a copper nail in the top distant 0.70 meter, and a copper nail in a stump northwest is distant 3.99 meters. The station is marked by a drill hole in a stone 18 inches below the surface.

Saddle Mountain (Clatsop County, J. J. G., 1874; 1875). Lost.

Neahkahnie (Tillamook County, J. J. G., 1875). On the highest point of the east peak of Neahkahnie Mountain. The station is marked by a drill hole in solid rock, and is best reached from the south face of the mountain.

Foley (Tillamook County, J. J. G., 1875). On the highest part of a well-defined round-topped grass-covered hill 2,000 feet high between the forks of Foley Creek and one of the tributaries of the south branch of the Nehalem. The station is marked by a one-half inch drill hole in a flat stone 4 inches below the surface. A large dead tree marked by an iron nail bears N. 39° W. magnetic distant 6.20 meters.

Crag (Tillamook County, J. J. G., 1875). On a high rocky peak, on the highest part of a ridge running north. The station is marked by a nail hole in a soft rock.

Miami (Tillamook County, J. J. G., 1875). A few feet from the summit of the northeast point of the highest hill northwest from the mouth of the Miami River. The station is marked by a drill hole in a granite block projecting 3 inches above the surface.

Boulder Point (Tillamook County, I. K., 1866; 1908). On the south side of Tillamook Bay on a heavily timbered prominent point, about 1 mile south of Dick Point dike. The station is marked by a drill hole in a 6-inch square rock buried even with the surface. For reference marks there is a drill hole in a triangular rock projecting about 6 inches, distant 13.27 meters, in azimuth 132° 12′, and a drill hole in a large bowlder projecting 2 feet, distant 5.00 meters, in azimuth 257° 14′.

Shell Point (Tillamook County, J. J. G., 1866; 1908). On the east side of Tillamook Bay, on the first prominent point above Bay City, commonly known as Goose Point, about 9 meters from the edge of the grass to the south and 5 meters from the grass to the west. The station is marked by a drill hole in a stone 5 inches square firmly set in the ground. There is a half-inch iron pipe set in a block of concrete 1.083 meters east. This is a United States Army Engineers' station. For a reference mark there is a drill hole in a rounding top stone set above the high-water line, distant 11.59 meters in azimuth 177° 00′.

Hebo (Tillamook County, J. S. H., 1908). On a mountain about 3,000 feet high, the highest in the locality, about 27 miles by road south of Tillamook. Approaching from the northwest the station is 4.5 meters to the left of the trail immediately upon reaching the first ridge of the summit. The station is marked 2 feet below the ground by a drill hole in the rock and at the surface by a standard disk station mark set in a flat stone. For reference marks there are drill holes in prominent large rocks; one is distant 6.69 meters in azimuth 67° 54′ and the other is distant 5.82 meters in azimuth 115° 09′.

Buzzard Butte (Tillamook County, J. S. H., 1908). Between two small knolls, which are about 4.5 meters apart on top of Bald Butte, west of Beaver, northwest of Hebo, and about 1 mile east and a little south of Buzzard Butte, 1,450 feet above sea level. The station is marked 1½ feet below the surface by a drill hole in a natural rock and at the surface by a standard disk station mark set in a flat rock. The reference mark is a drill hole in a large rock on the highest part of the summit on a small knoll, projecting 3 inches from the ground and distant 2.38 meters in azimuth 227° 30′.

Ginger (Tillamook County, J. S. H., 1908). About the center of the top on a little knoll on the highest point of a mountain east of Tillamook, on the Trask River road. The station is marked by a standard disk station mark set in a large rock flush with the surface. The reference mark is an inch drill hole 3 inches deep in a very prominent natural rock formation, distant 9.13 meters in azimuth 44° 00′.

White (Douglas County, O. B. F., 1904; 1906). On the highest part of the summit of White Rock, a prominent peak about 15 miles east of Roseburg. The station is marked by a three-eighths-inch copper bolt 3 inches long, cemented into a hole in a large bowlder, and directly above the bolt in the same drill hole is cemented an old-type station mark, which is a disk with a polished center surrounded by the raised letters "U. S. C. & G. S." and a raised flange around the edge. A cross in the top of the copper bolt and another in the polished center of the disk mark the station. For

[1] See pp. 81 and 82.

a reference mark there is a drill hole in the top of a three-eighths-inch copper bolt, which is cemented in a large bowlder just east of a prominent ledge and 34.44 meters from the station in azimuth 353° 11′.

Onion (Douglas County, O. B. F., 1904; 1906). On the highest part of the bare summit of Onion Springs Mountain, about 1 mile south of Onion Springs, and best reached from Glendale via Galesville and Gilpatrick's ranch. The station is marked by a three-eighths-inch copper bolt cemented in a drill hole in a rocky ledge, and directly above the bolt and in the same hole is cemented an old-type station mark, which is a disk with a polished center surrounded by the raised letters "U. S. C. & G. S." and a raised flange around the edge. A cross in the top of the bolt and another in the polished center of the disk mark the station. The two reference marks are drill holes in three-eighths-inch copper bolts cemented in drill holes; one in a prominent ledge, distant 24.62 meters from the station in azimuth 91° 50′, and the other in an inconspicuous low bowlder at the western edge of the summit and distant 47.22 meters in azimuth 182° 47′.

Camas (Coos County, J. S. H., 1906). On the south point of the high ridge which lies to the westward of Camas Valley, locally known as Kenyon Mountain. The eastern and southeastern slopes near the top are bare of trees, while the ridges to the north and west are heavily timbered. The instrument stand was the stump of a tree, so no station mark could be placed. The reference marks are three-fourth-inch holes drilled 2 inches deep in the ledge of rock to the east of the station; one is distant 22.062 meters in azimuth 277° 20′ 14″, and the other is distant 25.540 meters in azimuth 250° 07′ 05″, and the distance between the two marks is 11.700 meters. There is a United States Geological Survey station, a three-fourths-inch copper bolt in the northeast root of a lone fir tree, distant 5.982 meters in azimuth 353° 46′ 14″.

Boliver (Coos County, J. S. H., 1907). On a high rocky summit some 25 miles by trail, a little southwest of Camas Valley post office, and about 20 miles by trail west of West Fork station on the Southern Pacific Railroad. The station is marked by a copper bolt 1 inch in diameter and 6 inches long, placed 6 inches below the surface (an old Geological Survey mark), and a standard disk station mark set in cement in a stone is the surface mark. The reference marks are one-half-inch copper bolts set in cement in large stones, one about 6.1 meters southeasterly and the other about 7.6 meters southwesterly.

Johnson (Coos County, J. S. H., 1906). On the east side of the open summit known as Lookout Rock, on what is known as Johnson Mountain. About 15 meters southeast of a small fir tree with the lower branches trimmed off. Lines were opened on the west side of the summit to stations *Bennett* and *Sugar*. The station is marked by a standard disk station mark set in a large stone. The reference marks are copper bolts one-half inch in diameter set in cement in large stones, one distant 4.56 meters in azimuth 118° 24′ and the other distant 10.81 meters in azimuth 179° 22′.

Bennett (Coos County, J. S. H., 1906). On the highest point of the west summit of Bennetts Butte. The station is marked by a copper bolt set in cement in a drill hole in a stone 10 inches square and 8 inches deep set 2½ feet below the surface, and the surface mark is a standard disk station mark set with cement in a stone. The reference mark is a copper bolt driven in a small fir stump.

Sugar (Coos County, J. S. H., 1906). On a high summit 3½ miles east of Myrtle Point on what is locally known as Sugar Loaf Mountain. The station is marked by a copper bolt set in cement in a stone 2½ feet below the surface, and over this is a standard disk station mark set in concrete. There is a one-half-inch copper bolt driven in a small alder tree, distant 17.41 meters in azimuth 224° 24′ 05″, and another in a tree 3 feet above the ground, distant 7.69 meters in azimuth 294° 06′ 33″.

Westport (Coos County, J. S. H., 1906). On the highest point of a long, burned ridge, near the north and west edges of a summit covered with snags and second-growth trees. The station is marked by a one-half-inch copper bolt set with cement in a block of wood 10 inches in diameter and 12 inches long set 2½ feet below the surface, above which is a standard disk station mark set in a similar block of wood. There is a one-half-inch copper bolt driven in a snag distant 11.39 meters in azimuth 109° 26′, and a similar mark in a stump distant 19.19 meters in azimuth 259° 11′.

Cathcart (Coos County, J. S. H., 1906). On a wooded summit of the same name as the station, about 11 miles east of Marshfield. The station is marked by a one-half-inch copper bolt set in cement in a stone block 10 inches square by 8 inches deep, buried 2½ feet, and directly above this is a standard disk station mark set in a stone 12 inches square by 8 inches deep. The reference marks are one-half-inch copper bolts driven in blazed stumps, one distant 8.05 meters in azimuth 40° 04′ 04″, and the other is distant 7.04 meters in azimuth 343° 58′ 56″. There is a blazed tree 4.6 meters east of the station. This is an old United States Geological Survey triangulation station.

Noah (Coos County, J. S. H., 1906). On a high summit locally known as Noahs Butte, covered with second-growth timber, about 5 miles a little north of east from Marshfield. The station is marked by a copper bolt set in a cut stone 2½ feet below the surface, and at the surface by a standard disk station mark set in a cut stone. For reference marks there are one-half-inch copper bolts driven in the tops of large stumps, one distant 14.18 meters southwest, and the other distant 12.41 meters south.

Marshfield Hill (Coos County, E. F. D., 1889; 1906). On the brow of the hill just back of Marshfield, about 230 feet above the bay, and about 45 meters north of Nashburg's house. The station is marked by a one-half-inch copper bolt set in a stone buried 3 feet below the surface, and directly above this is a standard disk station mark set in a stone. The reference marks are one-half-inch copper bolts driven in large stumps, one distant 15.22 meters in azimuth 150° 16′ 45″, and the other distant 4.68 meters in azimuth 264° 23′ 17″.

Cape (Curry County, J. S. H., 1907). Near the middle one of the three most western projecting points of Cape Blanco and close to the fence line which follows the edge of the cliff. The station is marked by an empty cartridge cemented in a drill hole in the rock 2 feet below the surface and directly over it is a standard disk station mark. The

FIG. 5.—STATION BALD SHOWING THE 8-INCH POSITION INSTRUMENT IN PLACE, PROTECTED BY A WIND SHIELD.

reference marks are stones with one-half-inch drill holes in them, one is in the fence line along the cliff in range with the center line of the twin windows on the west side of the first story of the lightkeepers' dwelling, distant 8.56 meters, and the other is in range with the flagpole near the cliff to the north of the station, distant 6.84 meters, and the flagpole is distant 23.23 meters.

Madden (Curry County, J. S. H., 1907). On a heavily timbered butte 1½ miles northeast of Charles Zumwalt's place, on the Langlois-Port Orford stage road, one-half mile north of the Sixes River, about 25 or 30 feet southwest of the highest point of the butte. The station is marked by a cartridge shell set in a rock 8 inches square by 12 inches deep 1½ feet underground, and the surface mark is a standard disk station mark set in a stone flush with the surface. The reference marks are one-half-inch iron bolts driven into triangular blazes on fir trees, one distant 3.53 meters in azimuth 189° 31′, and the other distant 5.83 meters in azimuth 293° 38′.

Butler (Curry County, J. S. H., 1907). On the highest point of the highest isolated peak of Mount Butler. The station is marked by a three-fourths-inch iron bolt with a square head covered with sheet copper, marked with a cross, and the whole cemented into solid rock. There are two reference marks, each one-half-inch round iron set in drill holes in the rock, one distant 2.59 meters in azimuth 222° 22′, and the other distant 8.33 meters in azimuth 276° 22′.

Sixes (Curry County, A. W. C., 1869; 1905). On a high bank south of the Sixes River. The station is marked by a square block of wood with a hole drilled in it and filled with lead and placed 3 feet below the surface, over which is a bottle placed neck down. The surface mark is a standard disk station mark set in concrete. The reference marks are one-half-inch round iron driven into the sides of two small fir tree stumps, one distant 5.38 meters in azimuth 346° 50′, and the other distant 3.48 meters in azimuth 281° 07′.

Heads (Curry County, A. W. C., 1869; 1907). On the northern slope of the hill known as Port Orford Heads, in the center of an open field, about 200 yards south of Jensen's house, and about in range with the west side of the house and Maddens Butte. The station is marked by a 1½-inch drill hole in a block of stone filled with lead and buried 3 feet below the surface. At the surface is a standard disk station mark set in a stone. The two reference marks are five-eighths-inch drill holes in stones set flush with the surface of the ground, one distant 23.37 meters in azimuth 156° 53′ and the other distant 13.78 meters in azimuth 301° 55′. There is a blazed pine tree east 37.0 meters.

Port Orford Astronomical 2 (Curry County, J. S. H., 1907). On the high point and 12 meters from the edge of the bank, in a north and south fence line. The station is marked by a block of blue sandstone with a hole drilled in the top and filled with lead. The two reference marks are one-half-inch drill holes in blocks of sandstone set flush with the surface, one distant 9.11 meters in azimuth 88° 47′, and the other distant 14.68 meters in azimuth 192° 18′.

Bald (Curry County, J. S. H., 1907). On the highest point of the bare peak of Bald Mountain about 13 miles southeast of Port Orford by wagon road and trail. The station is marked by a three-fourths-inch iron bolt with a square head covered with sheet copper which is marked with a cross. The bolt is cemented into the rock with its top 6 inches below the surface. There is a pile of stones around the hole in the rock. The reference marks are three blazed trees.

Squirrel (Curry County, J. S. H., 1907). On the southwest summit of Bear Camp Ridge, locally known as Squirrel Camp, which lies between the Rogue and Illinois Rivers. The station is about 8 meters southwest of the highest point on the north side of an outcrop marked with a piece of brass one-half inch in diameter with a cross on the top set in rock. There is a piece of brass one-half inch in diameter set in the face of a rock lying on the brow of the hill distant about 14.5 meters in azimuth 111°, and a brass cartridge shell set in stone on the ridge distant about 10.4 meters in azimuth 1°.

Stack (Curry County, J. S. H., 1907). On the highest stack of rocks on what is known as Whiskey Flats. The station is a cartridge cemented in a 1-inch drill hole in a rock which lies between two larger and higher rocks bearing nearly east and west. The reference marks are cartridges cemented in holes in the rock, one distant 5.005 meters in azimuth 148° 20′, and the other distant 7.23 meters in azimuth 245° 40′.

Craggy (Curry County, J. S. H., 1907). On the spur of the highest peak of Craggy Mountains, about 100 yards west of the summit, on the second level bench from the top and 150 feet lower. The station is marked by a one-half inch drill hole in a rock. One reference mark is a 1½-inch drill hole 1 inch deep, in the bottom of which is a one-half inch drill hole, distant 1.59 meters in azimuth 229° 28′, and the other is a shallow 1½-inch hole in the top of a large isolated rock, distant 7.40 meters in azimuth 318° 22′.

Bosley (Curry County, J. S. H., 1907). On Bosley Mountain about 5 meters north of the highest point of rock on a level space. The station is marked by a standard disk station mark set in rock. The reference marks are one-half inch holes drilled in prominent rocks, one distant 7.63 meters in azimuth 261° 18′, and the other distant 7.98 meters in azimuth 23° 07′. A short distance south and a little higher than the station is a United States Geological Survey cairn.

Sundown 2 (Curry County, J. S. H., 1907). See the description of *Sundown* and the list of positions for the relation of the two stations. The station is marked by a standard disk station mark set in a stone 10 inches square and 14 inches deep, set level with the surface of the ground. A stone cube 16 inches on an edge with a drill hole in the top was set in the ground distant 6.58 meters in azimuth 77° 26′, and there is a one-half inch drill hole in the top of a rock distant 10.09 meters in azimuth 346° 23′. A fir tree 1½ feet in diameter is marked with a nail in a triangular blaze 6 feet from the ground distant about 24.73 meters in azimuth 229° 10′, and a large wire nail in the root of a fir tree stump is distant 16.895 meters in azimuth 359° 22′.

Grizzly (Curry County, J. S. H., 1907). On a bushy summit of Grizzly Mountain, about 6 miles by trail southeast of Gold Beach. Grizzly Mountain has two peaks probably 90 meters apart and the station is on the highest point of the northern peak. The station is marked by a hole drilled in a stone set 1 foot below the surface, above which is placed

a standard disk station mark set in a stone level with the surface. The reference mark is a drill hole in the top of a flat rock set in the top of the ridge south of the station, distant 14.38 meters in azimuth 346° 42′.

Pollywog (Curry County, H. A. S., 1913). On the highest part of the wooded butte about one-half mile south of Pollywog Butte, on the ridge extending south from Quail Prairie, and lying about 6 miles west of the Red Mountain range. The station is marked according to note 12,[1] with a large cairn of stones surrounding the mark.

Elk (Curry County, H. A. S., 1913). On the highest part of the well-known Elk Mountain, which stands on the north bank of the Winchuck River, about 8 miles from the mouth. The station is marked by a standard disk station mark set in a block of concrete 12 by 12 by 24 inches, and a standard disk reference mark is set in a block of concrete distant 2.599 meters in the direction of Bosley Mountain.

Pack Saddle (Curry County, H. A. S., 1913). On the highest part of Pack Saddle Mountain, a double-peaked mountain about 12 miles by trail from the Winchuck ranger station. The southwestern peak of this mountain is used by the Forest Service as a lookout station. The station is marked according to note 12,[1] with a standard disk reference mark cemented into a drill hole in the rock, distant 4.049 meters in range between the station and *Elk*.

High Divide (Del Norte County, Cal., H. A. S., 1913). On the highest part of the western bench of the plateau known as High Divide, about 10 miles east of Smith River Corners, Cal. The station is marked according to note 12,[1] with a cairn of stones built 3 feet high over and around the mark. There is a standard disk reference mark set in the highest stone on the hill, almost due west of the station, distant 8.495 meters.

Long Ridge (Del Norte County, Cal., H. A. S., 1913). On the highest part of the mountain known as High Dome. This mountain stands about 12 miles northeast of Gasquets Stage station. The station is marked according to note 12,[1] with a standard disk reference mark cemented into a drill hole in the top of a large square rock in place, distant 6.892 meters, in range between the station and *High Divide*.

Bald Hill (Del Norte County, Cal., H. A. S., 1913). About 1 mile beyond the Bald Hill ranch house on the old Kelsey trail. The station is marked according to note 12,[1] with a standard disk reference mark cemented into a drill hole in the top of a rock in place, distant 4.563 meters west of the station.

Gordon (Del Norte County, Cal., H. A. S., 1913; 1914). On the highest part of the summit of Gordon Creek Mountain, the large mountain standing on the west side of Hurdy Gurdy Creek. The station is marked according to note 12,[1] with a standard disk reference mark cemented in a drill hole in the top of a large rock about 4 feet high, distant 14.417 meters in range between the station and *Crescent City Lighthouse*.

Child (Del Norte County, Cal., H. A. S., 1913; 1914). On the western end of the highest part of what is known as Child's Hill, about 6 miles south of the well-known Bald Hills. The station is marked according to note 12,[1] with a standard disk reference mark set in a block of concrete 5.040 meters west.

Rattle (Del Norte County, Cal., H. A. S., 1914). On the highest part of Big Rattlesnake Mountain, which lies between Red Mountain and the south branch of the Smith River. The station is marked by a standard disk station mark set in an irregular block with a large cairn of rocks built around it. A standard disk reference mark set in a block of concrete is distant 7.90 meters north of the station.

Red Mountain (Del Norte County, Cal., H. A. S., 1913; 1914). About 5 meters north of the highest part of Red Mountain, about 20 miles east of Requa, Cal., on the north bank of the Klamath River. The station is marked according to note 12.[1] A large monument of stone standing 10.760 meters east of the station was used as a reference mark.

Mound (Del Norte County, Cal., H. A. S., 1914). On the small grassy knoll almost due south and about 100 feet below the summit of the first hill north of the mouth of the Klamath River, on what is known as the Lockwood place. The station is marked by a standard disk station mark set in a block of concrete, with a standard disk reference mark set in a pine tree about 3 feet above the ground, distant 12.650 meters north.

Klamath South 2 (Del Norte County, Cal., H. A. S., 1914). On the highest part of the bald hill standing on the south side of the mouth of the Klamath River. The station is marked by a standard disk station mark set in a block of concrete, with a standard disk reference mark cemented into a drill hole in a rock in place, distant 4.280 meters east.

Flint Rock 2 (Del Norte County, Cal., H. A. S., 1914). On the seaward face of the highest point of the large rock about 1 mile below the mouth of the Klamath River. The station is marked by a standard disk station mark set in a block of concrete, with a standard disk reference mark set in a block of concrete, distant 3.96 meters east.

Flint Ridge (Del Norte County, Cal., A. W. C., 1872; 1914). On the long sloping ridge back of Flint Rock, about 800 feet in elevation and 50 or 60 meters from the forest edge. The station is marked by a bottle buried 3 feet below the surface and at the surface by a standard disk station mark set in a bed of concrete.

High Bluff (Del Norte County, Cal., A. W. C., 1871; 1914). On the highest part of the first prominent point south of Flint Rock, about 1 meter from the edge of the bluff, which is the northern face and is almost perpendicular. The station is marked by a standard disk station mark set in a block of concrete surrounded by a large cairn of stones.

SUPPLEMENTARY POINTS.

Life (Lincoln County, J. S. H., 1908). On top of a high hill about 365 meters from an old life-saving station, 27 meters from a corner of a lookout cabin, and 37 meters from the edge of the bluff. The station is marked according to note 11;[1] one reference mark is distant 8.30 meters in azimuth 47° 12′, and the other is distant 7.35 meters in azimuth 160° 52′.

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[1] See pp. 81 and 82.

FIG. 6.—STATION BOSLEY SHOWING THE TYPE OF TARGET USED FOR THE SHORTER SECONDARY LINES.

Bill (Coos County, J. S. H., 1907). On the highest point of the bare summit known as Bill Peak. The Bandon trail passes at the foot of the summit. The station is marked by a drill hole in a rock 12 inches underground and at the surface by a rock which shows the locality but not the exact spot. One reference mark is a cartridge set in cement in solid rock north 9.10 meters, and the other is a wire nail set in cement in a drill hole in solid rock west 4.63 meters.

Edson (Curry County, J. S. H., 1907; 1909). About 25 meters north of the highest point of Edson Butte. There is a United States Geological Survey station marked by a pile of stones at the summit of the butte. The station is marked by a three-eighth inch iron plug with a punch hole in the top, set in cement in a drill hole in the rock, and standing 2 inches above the surface. The reference mark is a cartridge set in cement in a drill hole in the rock distant 5.16 meters in azimuth 140° 51′ 31″.

Cotton (Coos County, J. S. H., 1907). On the southwestern spur of the ridge of which Bennett Butte is the summit, about 7 meters west and a little south of the highest point, midway between two large fir snags, and a few feet south of the line joining them. The station is marked by a three-eighths inch drill hole in the top of a rock set 10 inches below the surface and by a three-eighths inch iron slug set in concrete at the surface of the ground.

Camas U. S. G. S. (Coos County, U. S. G. S., 1907). See the description of Camas.

Bear Mountain (Siskiyou County, Cal., H. A. S., 1914). This is the large rugged individual-looking mountain lying just south of Preston Peak. The top is broad and flat and has several small peaks, none of them rising very high above the summit of the mountain proper.

Preston Peak (Josephine County, H. A. S., 1914). This is the highest mountain of the Siskiyou group. The summit is sharp and the sides are steep. There are several slides and waterfalls on the sea side of the summit, and these make it easy to identify.

Second Peak north of Preston Peak (Josephine County, H. A. S., 1914). This is the second peak north of Preston Peak, along the same ridge. The peak is very sharp and the south slope is steep, looking from a distance as if it were a perpendicular bluff. It resembles Preston Peak in outline and general appearance, but is not so high.

Four Brothers No. 1 (Del Norte County, Cal., H. A. S., 1914). One of the four peaks of Ship Mountain, lying near the southwestern end of the Siskiyou range. They all look alike. They come to a sharp peak and the sides are steep. They lie a little closer to the coast than the balance of the Siskiyou group.

Four Brothers No. 2 (Del Norte County, Cal., H. A. S., 1914). See the description of Four Brothers No. 1.

Four Brothers No. 3 (Del Norte County, Cal., H. A. S., 1914). See the description of Four Brothers No. 1.

Four Brothers No. 4 (Del Norte County, Cal., H. A. S., 1914). See the description of Four Brothers No. 1.

COLUMBIA RIVER TO TILLAMOOK BAY.

PRINCIPAL POINTS.

Redwood (Tillamook County, J. J. G., 1875; 1885). About 2 miles from the point of the sand spit which separates the Nehalem River from the ocean, about 30 meters back from the high-water mark. The station is marked by a drill hole in a stone 2 feet below the surface.

Fishery (Tillamook County, J. J. G., 1875). On the east side of the Nehalem River, 3 miles above the mouth, on Fishery Point. The station is marked by a drill hole in a stone 10 inches below the surface.

Seely (Tillamook County, J. J. G., 1875). Lost.

Landing (Tillamook County, J. J. G., 1875). On Landing Point 120 meters south of some large rocks, about 5 meters back from the high-water mark and 6 feet above it. The station is marked 1 foot below the surface by a drill hole in a rock. There are three stakes around the station each distant 1.83 meters.

Point (Tillamook County, J. J. G., 1875). On the highest part of the sand spit one-third mile from the point, near the mouth of the Nehalem River. The station is marked 2 feet below the surface by a drill hole in a stone. Three stakes were set each distant 1.83 meters from the station.

Keaton (Tillamook County, J. J. G., 1875). The station is marked by a drill hole in a stone 2 feet below the surface and probably is lost.

Carlton (Tillamook County, J. J. G., 1875). On the narrow ridge on top of the tall butte on the shore line at the western slope of the Neah-kah-nie mountain. The butte is bare except on the northern part which is covered with scrubby spruce and grass. The station is 0.9 meter from the edge of the bluff to the west and 28 paces from the point to the north. The station is marked 6 inches below the surface by a drill hole in a rock.

Sherman (Clatsop County, J. J. G., 1874). On the highest knoll of the high sand ridge near the ocean, about 4 miles south of Point Adams. The station is marked 2 feet underground by a drill hole in a stone. There are three stakes around the station, each distant 1.83 meters.

Boom (Clatsop County, J. J. G., 1874). On a sand ridge about 75 meters from the shore and about 80 feet above sea level, about 230 meters north of a fence. The station is marked 2 feet below the surface by a drill hole in a rock. There are three stakes around the station, each distant 1.83 meters.

Morrison (Clatsop County, J. J. G., 1874). On a grassy sand hill which runs the entire length of Clatsop Plains, 41 meters north of a fence, and 60 paces west of another and lower ridge beyond which is a creek. The station is marked 1½ feet below the surface by a drill hole in a stone. Three stakes were placed around the station distant 1.83 meters.

Goodwin (Clatsop County, J. J. G., 1874). On a grassy sand ridge, the second west of Mr. Goodwin's house, 11 meters west of the brow of the hill, and 109 meters south of a fence. The station is marked 1½ feet below the ground

by a drill hole in a stone. Three stakes are set around the station, distant 1.83 meters. Mr. Goodwin's house bears S. 44° 30′ E. magnetic, distant 375 meters.

Lake (Clatsop County, J. J. G., 1874). On the high ridge at the ocean beach, 107 paces north of the south boundary of Mr. Goodwin's land, 200 meters southwest of a small lake, and 100 paces back from the high water, and 60 feet above it. The station is marked 2 feet below the surface by a drill hole in a stone. Three stakes were set around the station, each distant 1.83 meters.

Condit (Clatsop County, J. J. G., 1874). On the second sand ridge west of the road, 46 paces south of Mr. Condit's north boundary fence, and 10 paces west from the brow of the hill. The station is marked 2 feet below the surface by a drill hole in a stone. Three stakes are set around the station, each distant 1.83 meters.

Callender (Clatsop County, J. J. G., 1874). On the highest sand hill in the vicinity, 83 meters from the high-water mark, and 75 feet above it, 6 paces west and 20 paces east from the edges of the knoll, and 22 paces from the point of the knoll toward Tillamook Head. The station is marked 2 feet below the surface by a drill hole in a stone. Two stakes are set, one on either side of the station, in a line parallel with the shore, and one at right angles to this line to the east, each distant 1.83 meters.

Gearhart (Clatsop County, J. J. G., 1874). On a sand ridge about one-half mile north of the mouth of Nekanakum Creek, 120 paces back from the shore line, 35 meters N. 60° E. magnetic of a round grassy mound, and 50 feet above high tide. The station is marked 2 feet below the surface by a drill hole in a stone. There are two stakes, one on either side of the station, in a line parallel with the shore, and one stake inshore from the station, each distant 1.83 meters.

Meadow (Clatsop County, J. J. G., 1874). In a long meadow on the ridge nearest the timber, from which it is 100 paces distant, and 430 meters south of a fence. The station is marked 1½ feet below the surface by a drill hole in a rock. Three stakes, one each north, south, and east, are distant 1.83 meters. There is a copper nail in a blazed pine tree S. 8° 30′ E. magnetic, distant 93 paces.

Loomis (Clatsop County, J. J. G., 1874). On the east bank of the Nekanakum Creek, 650 meters south of its junction with the Neocoxie Creek, a few meters west of the county road, and 3 meters from the edge of a bluff which is 12 feet high. The station is marked 1½ feet below the surface by a drill hole in a stone. Two stakes are set in a line parallel with the bank and one at right angles inshore, each distant 1.83 meters. Mr. Loomis's residence is distant 285 meters N. 44° E.

Grimes (Clatsop County, J. J. G., 1874). On the peninsula between the ocean and Nekanakum Creek, 870 meters north of a road leading to the beach, 10 meters west of the edge of the pines, 132 meters back from the high-water mark, and 15 feet above the tide. The station is marked 2 feet below the surface by a drill hole in a stone. Two stakes are placed in a line parallel with the beach and one at right angles to this line inshore, each distant 1.83 meters.

Dunce (Clatsop County, J. J. G., 1874). On the rocky shore line between the high-water line and the foot of the bluff, at the most westerly point that can be seen from the Seaside House, 4 meters below the extreme high-water mark, and 6 meters above ordinary high water. The station is marked by a drill hole in the top of a flat bowlder flush with the surface.

Rivulet (Clatsop County, J. J. G., 1874). In front of the highest part of the last yellow bluff, 100 meters east of a small stream, 15 paces from the foot of the bluff, and 4 paces from the ordinary high-water mark. The station is marked by a drill hole in the top of a large bowlder.

Cliff (Clatsop County, J. J. G., 1874). On the most distant point on Tillamook Head, visible from stations Loomis and Grimes, 1 meter in front of the vertical wall of the cliff, and 8 meters from the ordinary tide line. The station is marked by a drill hole in the top of a large irregular bowlder 3 feet high, 4 feet long, and 2 feet wide on top.

Ledge (Clatsop County, J. J. G., 1874). Between the foot of the bluff and the high-water mark. The station is marked by a drill hole in the top of a large bowlder.

Islet 1 (Clatsop County, J. J. G., 1874). A rocky island nearest the shore, 150 feet high, and pointed at the top.

Islet 2 (Clatsop County, J. J. G., 1874). It is the second island from the shore and second also in size. It is 120 feet high and pointed at the top.

Pinnacle Rock (Clatsop County, J. J. G., 1874). A tall rock pillar about 30 feet high at the most western point of Tillamook Head, 10 paces from the foot of the cliff, and surrounded by water at high tide. It has a large base, slim body, and is pointed at the top.

Dexter (Clatsop County, J. J. G., 1874). In the deepest part of the bight northeast of Tillamook Head at the point where the Nekanakum Creek approaches nearest to the ocean, on a rocky ridge just back of the driftwood, 13 meters back of the high-water mark, 120 meters west of one fence and 132 meters east of another fence, and 30 paces north of a road. The station is marked by a drill hole in a bowlder flush with the surface.

Flagstaff (Clatsop County, J. J. G., 1874). Flagstaff standing near the bathhouse attached to the Seaside House.

Seaside House, cupola (Clatsop County, J. J. G., 1874). Flagstaff on the cupola of Mr. Ben Holliday's hotel, the Seaside House.

Falcon (Tillamook County, J. J. G., 1875). On the southwest part of Cape Falcon, on the highest part of the prairie where it begins to slope to the westward, 4 paces from the edge of the bluff to the south, and 20 paces to the edge at the west. The station is marked 1½ feet below the surface by a drill hole in a stone. Two stakes were set, one on either side of the station, in a line parallel with the southern edge of the bluff and one to the north at right angles to this line, distant 1.83 meters.

FIG. 7.—A POINT ON A ROCKY SECTION OF THE TRAIL BETWEEN RED MOUNTAIN AND RATTLESNAKE MOUNTAIN, SHOWING THE PACK ANIMALS.

FIG. 8.—THE TYPE OF COMBINATION SIGNAL AND INSTRUMENT STAND USED BY ONE CHIEF OF PARTY WHERE THE LINES WERE SHORT.

Bend (Tillamook County, J. J. G., 1875). On the south side of the Nehalem River, on a rounding point partly covered with grass. The station is marked 2 feet below the surface by a drill hole in a stone. There are two blazed spruce trees; one bears N. 71° W. (magnetic), distant 9.93 meters, and the other bears N. 55° E. (magnetic), distant 11.73 meters.

TILLAMOOK BAY.

PRINCIPAL POINTS.

Doty (Tillamook County, J. S. H., 1908). On the second small spur, 185 meters from the summit, and the same distance beyond the first prominent spur below the summit, 1,360 feet above the sea level. The station is marked by a standard disk station mark set in a rock projecting 2 inches above the surface. The reference mark is a drill hole at the intersection of cross lines in a rock projecting 3 inches above the surface, distant 2.10 meters in azimuth 110° 57′.

Green Hill 2 (Tillamook County, J. S. H., 1908). On the southeast slope of a hill about 45 meters from the highest part, and below all the prominent trees. The station is marked according to note 11,[1] except the reference marks are nails driven into blazed trees. One reference mark is distant 7.8 meters in azimuth 145° 25′ and the other is distant 5.3 meters in azimuth 221° 07′.

Pitcher Point (Tillamook County, J. K., 1866; 1908). A few meters east of the extremity of the last prominent point, approaching from the east, on the south side of Tillamook Bay, about 4 meters northwest of the bluff. The station is marked by a drill hole in a stone, buried on the beach below the high-water mark. There is a large cross cut in the top of a prominent rock distant 2.77 meters in azimuth 202° 27′.

Tillamook Bay, west base (Tillamook County, J. K., 1866). On the northwest side of the bay, about 50 meters north of Killchep Point, and near the high-water mark. The station is marked by a drill hole filled with lead, in a stone 2½ feet long, set with the top level with the surface. Two stones were placed one on either side of the station and in line with it and another at right angles to this line, and a drill hole in the top of each is distant 1.22 meters.

Rocky Point (Curry County, 1866; 1869). Lost.

Mud (Tillamook County, J. K., 1866). On the flats south of the bay, below the high-water mark. The station is marked according to note 10.[1]

Slough (Tillamook County, J. K., 1866). Near the edge of a slough, on tide land on the southeast side of Tillamook Bay. The station is marked according to note 10.[1]

Tillamook Bay, east base (Tillamook County, J. K., 1866). On the north side of the bay and about 20 meters from the high-water mark, and in front of and about 10 meters distant from Peter Morgan's house. The station is marked by a drill hole filled with lead in a stone 2½ feet long, set with the top level with the surface. Two stones were placed, one on either side of the station and in line with it, and another at right angles with this line, and a drill hole in the top of each is distant 1.22 meters.

Sand 1908 (Tillamook Bay, J. S. H., 1908). On the west edge of the sand spit on the west side of Tillamook Bay. The station is marked by a nail driven in the top of an old log.

Pyramid Rock (Tillamook County, J. S. H., 1908). On the highest point of a large rock, said to be 109 feet high, about 5 miles south of Tillamook bar and 1 mile offshore northwest of Cape Mears Lighthouse. The station is marked by a galvanized-iron pipe 18 inches in diameter and 4 feet long riveted on a brass pipe, which is cemented 1½ feet in the rock. The upper half of the pipe is painted black and the lower half white.

Spit (Tillamook County, J. S. H., 1908). On a sand spit on the west side of Tillamook Bay, marked by a redwood post in the sand and projecting 18 inches.

Stump (Tillamook County, J. K., 1866). On the north bank of the Kilchis River, and is covered at high water. The station is marked according to note 10.[1]

Sandstone Point (Tillamook County, J. K., 1866). Lost.

Flat (Tillamook County, J. K., 1866). On the flats, covered at high water, on the west side of Tillamook Bay. The station is marked according to note 10.[1]

Memalust Head (Tillamook County, J. K., 1866). Lost.

Sand Hill (Tillamook County, J. K., 1866; 1885). On a prominent sand hill on the west side of Tillamook Bay. The station is marked by a drill hole in a rock.

Bailey Point (Tillamook County, J. K., 1866). On a prominent point about 100 meters south of Bailey's house. The station is marked according to note 10.[1]

Green Hill (Tillamook County, J. K., 1866; 1875). Lost.

Brush (Tillamook County, J. K., 1866; 1885). On a high sand hill on the west side of a sand spit, and is marked by a drill hole in a stone.

Middle (Tillamook County, J. K., 1866). On the highest part of a ridge. The station is marked according to note 10.[1]

Sand (Tillamook County, J. K., 1866). On the sand spit near the south side of the entrance to Tillamook Bay. The station is marked 3 feet below the surface by a drill hole in a stone.

Log (Tillamook County, J. K., 1866). On the north shore of the bay, near the high-water mark. The station is marked according to note 10.[1]

Gap (Tillamook County, J. K., 1866). Lost 1908.

[1] See pp. 81 and 82.

NESTUGGA BAY.

PRINCIPAL POINTS.

Round Top (Tillamook County, J. S. H., 1908). On the highest point of the most prominent bald butte west of Cloverdale, 1,130 feet above high-water mark. The station is marked 1½ feet below the surface by a drill hole in a flat rock and at the surface by a drill hole in a triangular-shaped rock. The reference marks are two blazed snags, one distant 10.9 meters in azimuth 34° 50′, and the other distant 1.40 meters in azimuth 216° 35′.

Flat (Tillamook County, J. S. H., 1908). On the highest part of a low, bare, flat-topped ridge about 3½ miles from Cloverdale. The station is marked by a drill hole in the natural rock 14 inches below the surface; over this is a drill hole in an irregular-shaped rock level with the surface. Three galvanized-iron nails in a blaze in an old snag 5 feet in diameter are distant 3.07 meters in azimuth 23° 10′.

Fletcher (Tillamook County, C. R., 1883; 1908). On the south side of the Little Nestugga River, 35 meters northwest from the highest part of a hill between the river and the road leading to the Grande Ronde Reservation. There is a large hole 3.5 meters west of the station and a blazed tree 37.8 meters southwest. The station is marked 3 feet underground by a copper tack in the cork of a bottle and at the surface by a drill hole in a large rock.

Bozley (Tillamook County, C. R., 1883; 1908). In the middle, east and west, of the northern summit of the highest hill immediately east of the entrance to Nestugga Bay and 39.8 meters east of a fence. The station is marked 2½ feet underground by a copper tack in the cork of a bottle and at the surface by a drill hole 3 inches deep in a large rock. There is a drill hole in a smooth stone on a small knoll directly north, distant 8.115 meters.

Gage B (Tillamook County, J. S. H., 1908). On the east side of a high green hill on the north side of Nestugga Bay, about on line between Bozley and Round Top, 33 meters from the top of the hill. The station is marked by an inch drill hole in a large rock flush with surface. There are three galvanized-iron nails in a blaze in a snag about 12 meters west-southwest magnetic, and another blazed snag bears east-southeast magnetic, distant about 8 meters.

Sheep Hill (Tillamook County, C. R., 1883; 1908). On the top of a bare hill northeast of and overlooking the entrance to Nestugga Bay and about one-half mile from the bay shore, about 70 meters east of the road that runs around the top of the hill. The station is marked 3 feet underground by a copper tack in the cork of a white glass bottle, and the surface mark is a drill hole in a rock filled with lead. There is a small hole at the intersection of cross lines on a circular rock south 7.205 meters, and there are four galvanized nails in a small blazed tree south 54.4 meters.

Fern Hill (Tillamook County, C. R., 1883; 1908). On a high rocky hill covered with spruce, alder, and fern, one-half mile east of the road leading to Grande Ronde Valley. The station is marked 18 inches below the ground by cross lines on a flat rock and at the surface by a drill hole in a rock filled with lead.

Goose (Tillamook County, C. R., 1883). Near the mouth and on the north side of the Little Nestugga River, about 330 meters from the end of a small peninsula and 35 meters from the river shore. The station is marked by a copper tack in the top of a cedar post 2 feet long and 6 inches square.

Craven (Tillamook County, C. R., 1883). On the north side of the Little Nestugga River, on low land 53 meters from the edge of the woods. The station is marked by a copper tack in the top of a cedar post 2½ feet long and 6 inches square, projecting 4 inches above the surface.

Vine Maple (Tillamook County, C. R., 1883). On low ground close to the edge of the woods at the foot of the hill, on a rounded point on the south side of Little Nestugga Bay, about three-fourths mile from the junction with the Big Nestugga Bay. The station is marked 3 feet underground by the cross lines on a flat stone and at the surface by a copper tack in the top of a cedar post 18 inches long by 6 inches in diameter.

Gage (Tillamook County, C. R., 1883). On the north side of Nestugga Bay on tide land, about 150 meters from the mud flats and 30 meters east of a small creek. The station is marked by a copper tack in the top of a redwood stake 3 feet long by 6 inches in diameter.

Grass (Tillamook County, C. R., 1883). On low ground on the north side of Little Nestugga Bay. The station is marked by a copper tack in the top of a cedar post 18 inches long by 6 inches in diameter.

Nestugga (Tillamook County, C. R., 1883). A few meters from the brink of the bluff fronting the entrance to the Nestugga River, about 141 feet above sea level. The station is marked 2½ feet underground by a copper tack in the cork of a bottle and at the surface by a drill hole, filled with lead, in a large rock.

Point (Tillamook County, C. R., 1883). About one-half mile from the point of the sand spit forming the north side of the entrance to Nestugga Bay, and about 90 meters from the sea beach at ordinary high water. The station is marked by a copper tack in a block of fir wood, 3 feet long and 8 inches square, set in the sand.

Shersingér (Tillamook County, C. R., 1883). On the east side of the Nestugga Bay, about 4 meters from the foot of the bluff. The station is marked underground by crosslines on a flat stone and at the surface by a large rock with rectangular crosslines.

Beach (Tillamook County, C. R., 1883). About 1½ miles from the point of the sand spit forming the north side of the entrance to Nestugga Bay, about 90 meters from the sea shore. The station is marked by a copper tack in a cedar post, 2½ feet long and 6 inches in diameter, set in the sand.

Green Bluff (Tillamook County, C. R., 1883). On the east shore of Nestugga Bay, on the rocky beach nearly at the extreme high water line and about 7 meters from the foot of a high green bluff. The station is marked 20 inches

[1] See pp. 81 and 82.

underground by cross lines cut on a flat stone and the same kind of mark was placed level with the surface. There is a cedar stake at the foot of the cliff distant 7.47 meters S. 82° W. magnetic.

Red Rock (Tillamook County, C. R., 1883). On the sharp point at the foot of the red rocky bluff on the extremity of the point forming the south side of the Little Nestugga River at its junction with the Big Nestugga River. The station is marked 8 inches underground by a cross cut in the solid rock and at the surface by a cross cut in a stone.

Talbert (Tillamook County, C. R., 1883). On top of a fern-covered hill, about 200 meters west of the main road from Grande Ronde to Slab Creek. The station is marked 2 feet underground by cross lines on a flat stone and at the surface by a drill hole, filled with lead, in a large rock.

Shortridge (Tillamook County, C. R., 1883). On the brow of a bluff close to the ocean, about three-fourths mile south of the entrance to Nestugga Bay, on the summit of a knoll about 175 meters north of the road from Grande Ronde Reservation. The station is marked 3 feet underground by a copper tack in the cork of a bottle and at the surface by a drill hole in a rock filled with lead.

Faulconer (Tillamook County, C. R., 1883). On the outer edge of a range of hills fronting the ocean beach and about 1¼ miles south of the entrance to Nestugga Bay, on a small spur of the hill lower than the summits back of it but projecting more to the seaward than any of the others. The station is marked 2½ feet underground by crosslines on a flat rock and at the surface by a drill hole, filled with lead, in a large rock.

Spruce (Tillamook County, C. R., 1883). On low grassy land on the south side of Little Nestugga Bay. The station is marked 3 feet underground by cross lines on a flat rock and at the surface by a copper tack in a cedar post 18 inches long by 6 inches in diameter.

Alder Point (Tillamook County, C. R., 1883). On the north side of Little Nestugga Bay, on a rounding point between the mud flats and the foot of the hills. The station is marked by a copper tack in a cedar post 2½ feet long and 6 inches in diameter.

Mullaney (Tillamook County, C. R., 1883). On low ground on the east side of the Big Nestugga River, one-half mile above the junction with the Little Nestugga River, about 75 meters from the river bank and 40 meters from the foot of the hills. The station is marked 3 feet underground by a beer bottle with a copper tack in the cork and at the surface by crosslines on a large rock.

Sand Dune (Tillamook County, C. R., 1883). On a sand dune in the middle of the peninsula 1¾ miles from the entrance to Nestugga Bay. The station is marked by a copper tack in the top of a cedar post 2½ feet long by 6 inches square.

Buckhorn (Tillamook County, C. R., 1883). On the ocean shore about 1½ miles north of the entrance to Nestugga Bay. The station is marked by a copper tack in a cedar post, 2½ feet long and 6 inches in diameter, set in the sand.

Barnhart (Tillamook County, C. R., 1883). On the rocky beach close to the foot of the bluff on the north side of the point at the junction of the Big and Little Nestugga Rivers. The station is marked 18 inches underground by crosslines on a flat rock and at the surface by crosslines on a large rock.

Horseshoe Dune (Tillamook County, C. R., 1883). The station is marked by a copper tack in the top of a cedar post 3 feet long by 6 inches in diameter.

Hardy Rock (Tillamook County, C. R., 1883). On the ocean shore about 2 miles above the entrance to Nestugga Bay, and 110 meters back from the high water line. The station is marked by a copper tack in the top of a cedar post 2½ feet long and 6 inches in diameter.

Nestugga Bay southeast base (Tillamook County, C. R., 1883). Close to the edge of the shore on the east side of the Nestugga River. The station is marked 3 feet underground by a copper tack in the cork of a bottle and at the surface by a copper tack in a large block of cedar projecting 3 inches above the surface.

Drift (Tillamook County, C. R., 1883). On the ocean shore north of the entrance to Nestugga Bay and 110 meters from the high-water line. The station is marked by a copper tack in the top of a cedar post 2½ feet long by 6 inches in diameter.

Nestugga Bay northwest base (Tillamook County, C. R., 1883). On the east side of the Nestugga River about 2 miles from the entrance and 20 meters from the shore line. The station is marked 3 feet underground by a copper tack in the cork of a bottle and at the surface by a copper tack in a block of cedar projecting 3 inches above the ground. There are 3 cedar stakes, one each north, south, and east of the station.

YAQUINA BAY AND RIVER.

PRINCIPAL POINTS.

Jet (Lincoln County, J. W. M., 1914). Close to the old south jetty, and about 200 meters from the light on the end of the jetty. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

Port (Lincoln County, J. W. M., 1914). On a hill in Newport and just back of Abbey Hotel, in a proposed street. The station is marked according to note 13.[1] The reference mark is 3.05 meters east (magnetic).

Wire (Lincoln County, J. W. M., 1914). On the first sand hill across the bay from Newport, close to the home of Mr. Tracy Davis, and about 150 meters from the old tramway. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

Mack (Lincoln County, J. W. M., 1914). On McLeans Point, about 180 meters east and upstream from Entrance Range rear light, about 7 meters from high water and 4 meters from the bottom of the bluff. The station is marked

[1] See pp. 81 and 82.

by a standard disk station mark set in a pier of concrete resting on solid rock. A standard disk reference mark set in concrete is 2.13 meters north (magnetic).

Yaquina east base (Lincoln County, J. W. M., 1914). On the sand flats across Yaquina Bay from Newport, on what is locally known as Sand Beach, 32 paces from an old tramway, and just at the high-water line. The station is marked according to note 13.[1] The reference mark is 12.80 meters south (magnetic).

Yaquina west base (Lincoln County, J. W. M., 1914). On the sand flats across from Newport, and not far from the old tramway, at the junction with the jetty, a little below the high-water mark. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

Hint (Lincoln County, J. W. M., 1914). On the end of the sand spit which projects off what is locally known as Idaho Point, between the high-water mark and the end of the grass. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

Bend (Lincoln County, J. W. M., 1914). On that part of the bay locally known as Sallies Bend, about 1½ miles from Yaquina, about 1.5 meters from high water, and about 6 meters from the foot of the bluff. The station is marked by a standard disk station mark set in concrete resting on solid rock. There is a standard disk reference mark set in concrete 3.05 meters north (magnetic).

Quill (Lincoln County, J. W. M., 1914). On the end of Coquille Point on the made ground, known as cribbing, and about 15 meters from the foot of the bluff. The station is marked by a standard disk station mark set in the top of a 1-inch galvanized-iron pipe, the whole being set in a bed of concrete. There is a standard disk reference mark set in concrete 6.10 meters east (magnetic) of the station.

Made (Lincoln County, J. W. M., 1914). On the east side of Yaquina Bay about halfway between Yaquina and Coquille Point Light, on made ground known locally as cribbing. It is marked according to note 13,[1] except that the station mark is set in a 1-inch galvanized-iron pipe. The reference mark is 3.05 meters southeast (magnetic).

Case (Lincoln County, J. W. M., 1914). Near the high-water mark, on a point owned by Mrs. Mary Case, about 20 meters north-northeast of her house. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

Yaq (Lincoln County, J. W. M., 1914). In the front yard and about 10 meters northwest of the Yaquina depot, on a line with the bay side of the building. The station is marked by a standard disk station mark set in a 1-inch galvanized-iron pipe, the whole being set in a bed of concrete 9 inches in diameter and 2 feet deep. There is a beer bottle 2½ feet below the surface. There is a standard disk reference mark set in concrete 3.05 meters east (magnetic).

Soft (Lincoln County, J. W. M., 1914). On the mud flats, about 10 meters out from the high-water line, close to a small wharf at West Yaquina. The station is marked by a standard disk station mark set in a 1-inch galvanized-iron pipe 3 feet long, the whole being set in a bed of concrete 8 inches in diameter and 3 feet deep.

Out (Lincoln County, J. W. M., 1914). On the west side of the bay, about one-fourth mile above West Yaquina, on mud flats. The station is marked by a standard disk station mark set in a pier of concrete 8 inches in diameter at the top and 2½ feet deep.

Wise (Lincoln County, J. W. M., 1914). On a sharp, rocky, wooded point, just out from what is locally known as Wisers railroad cut, about 20 feet above high water. The station is marked according to note 13 [1] except that the surface mark is set in a 1-inch iron pipe. The reference mark is 3.05 meters north by east (magnetic).

Log (Lincoln County, J. W. M., 1914). On the west side of Yaquina Bay, across and due northwest (magnetic) from Oneatta, about 10 meters from the rock bluff, between the high and low water marks, near a large log. The station is marked by a standard disk station mark set in the top of a 1-inch iron pipe set in concrete which rests on bed rock. There is a standard disk reference mark set in concrete 6.10 meters west (magnetic).

Et (Lincoln County, J. W. M., 1914). On the extreme end of a sharp wooded point, where the Oneatta sawmill was formerly located, just above high water. The station is marked according to note 13,[1] reference mark is 4.69 meters east (magnetic).

Stump (Lincoln County, J. W. M., 1914). About 2 miles below Oysterville, on the south side of the bay, at the beginning of the bend, between high and low water marks, and between two large stumps. The station is marked according to note 13,[1] except the station mark is set in a 1-inch galvanized iron pipe. The reference mark is 4.27 meters south (magnetic).

Water (Lincoln County, J. W. M., 1914). On the mud flats about one-fourth mile up the stream from Oneatta. The station is marked by a standard disk station mark set in a pier of concrete 8 inches in diameter and 3 feet deep.

Mud (Lincoln County, J. W. M., 1914). On the south side of Yaquina Bay, on the mud flats opposite the home of Ed. Harlow. The station is marked according to note 13,[1] except that the surface mark is set in a 1-inch pipe. The reference mark is 6.10 meters south (magnetic).

Road (Lincoln County, J. W. M., 1914). Close alongside the railroad track, being 1.905 meters from the outside rail. The station is marked by a standard disk station mark cemented in a 1-inch galvanized iron pipe, which is set in a cylindrical bed of cement, 8 inches in diameter at the top, 1 foot deep and resting on bed rock. There is a standard disk reference mark set in concrete 3.05 meters east (magnetic).

Caf (Lincoln County, J. W. M., 1914). On the north end of an island known locally as Caffery Island, about 10 meters from the edge of the bluff and 30 feet above high water. The station is marked according to note 13,[1] except the surface mark is set in a 1-inch iron pipe. The reference mark is 3.05 meters south (magnetic).

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[1] See pp. 81 and 82.

Rail (Lincoln County, J. W. M., 1914). Directly across the bay from a prominent wooded hill which is on the west side of a small slough, and alongside the railroad, being 1.600 meters from the outside rail, close to the edge of the bluff. The station is marked according to note 13,[1] except that the station mark is set in a 1-inch galvanized iron pipe. The reference mark is 12.19 meters west (magnetic).

Can (Lincoln County, J. W. M., 1914). On the north side of Yaquina Bay at the flag station called Oysterville, opposite Oyster City, about 170 meters east of an old cannery. The station is marked according to note 13.[1] The reference mark is 4.27 meters north (magnetic).

King (Lincoln County, J. W. M., 1914). At the east end of Oyster City, near the high water and close to a large log sunk in the ground. The station is marked according to note 13,[1] except that the surface mark is set in a 1-inch iron pipe. The reference mark is 3.05 meters south (magnetic).

Gravel (Lincoln County, J. W. M., 1914).On a gravel beach at the east end of Oyster City, between the high and low water marks. The station is marked according to note 13,[1] except that the surface mark is set in a 1-inch galvanized iron pipe. The reference mark is 11.58 meters south (magnetic).

Slope (Lincoln County, J. W. M., 1914). Across the river and a little upstream from Oyster City, at the high-water line and about 10 paces from the railroad track. The station is marked according to note 13.[1] The reference mark is 3.05 meters north (magnetic).

Low (Lincoln County, J. W. M., 1914). On the north side of Yaquina Bay, about 900 meters east of Oyster City, on a low point near the railroad track. The station is marked according to note 13.[1] The reference mark is 6.10 meters north (magnetic).

Shell (Lincoln County, J. W. M., 1914). On a mud beach between the high and low water line, in front of a house belonging to Mr. Morgison, near an old wharf, and surrounded by many clam shells. The station is marked according to note 13.[1] The reference mark is 45.72 meters south of the station (magnetic).

Pile (Lincoln County, J. W. M., 1914). The station is a 1-inch drill hole in the top of a pile on the west side of Dr. McIntyre's wharf. A broom stick was stuck in the hole.

Pine (Lincoln County, J. W. M., 1914). On the end of a point locally known as Rocky Point, on the high ground between the railroad and the bay. The station is marked according to note 13,[1] except there is no subsurface mark and the concrete rests on hardpan. The reference mark is 4.88 meters north (magnetic).

Cut (Lincoln County, J. W. M., 1914). On the north side of the bay about 30 feet above high water, between the railroad cut and the bay. The station is marked according to note 13.[1] The reference mark is 3.05 meters north (magnetic).

Clay (Lincoln County, J. W. M., 1914). On the south side of Yaquina Bay, near a channel range and about 50 meters east of the old shipyard. The station is marked according to note 13,[1] except there is no underground mark. The reference mark is 3.05 meters south (magnetic).

Shelf (Lincoln County, J. W. M., 1914). On the north side of Yaquina Bay, between the houses belonging to Jackson and McIntyre, on a shelf of soft rock about 2 feet under water at high water. The station is marked according to note 13.[1] The reference mark is 3.66 meters east (magnetic).

Boone (Lincoln County, J. W. M., 1914). On land owned by the old Boone estate, about 100 meters east of a deep cut, 1.5 meters from the outside rail. The tide flats extend out some distance opposite the station. The station is marked according to note 13.[1] The reference mark is 6.70 meters west (magnetic).

Slue (Lincoln County, J. W. M., 1914). On a marshy point near the water's edge, north of a slough and not far from the old Boone homestead. The station is marked according to note 13.[1] The reference mark is 3.05 meters west (magnetic).

Wharf (Lincoln County, J. W. M., 1914). On the east side of the Yaquina River close to a small wharf near the old Jackson place, between high and low water, in a black muck marsh. The station is marked according to note 13.[1] The reference mark is 53.03 meters east (magnetic).

Slip (Lincoln County, J. W. M., 1914). On the marshy flat between the round point across from Mill 4 railroad station and the small wharf near Mr. Jackson's house. The station is marked according to note 13.[1] The reference mark is 5.49 meters east (magnetic).

Hill (Lincoln County, J. W. M., 1914). At the east end of Boones Slough, not far from the old Boone place, on the side of a hill on the west side of a railroad track, about 30 feet above high water. The station is marked according to note 13.[1] A standard disk reference mark in concrete is 3.66 meters west (magnetic) of the station.

Red (Lincoln County, J. W. M., 1914). Close to a railroad cut, not far from the east end of a trestle, between the track and the bluff. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

Spit (Lincoln County, J. W. M., 1914). On a sand spit which extends southwest from a round point. It is near the round point and bare at about half tide. The station is marked according to note 13.[1] The reference mark is 28.04 meters east (magnetic).

Near (Lincoln County, J. W. M., 1914). On the round point across from Mill 4 railroad station, on the mud beach between high and low water. The station is marked according to note 13.[1] The reference mark is 13.41 meters south (magnetic).

Mill (Lincoln County, J. W. M., 1914). On a grassy marsh at high water. The station is marked according to note 13.[1] The reference mark is 3.66 meters west (magnetic).

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[1] See pp. 81 and 82.

Dead (Lincoln County, J. W. M., 1914). On the west end of a large marsh which extends nearly from the Montgomery house to the station, near the high-water line. There are many large dead tree trunks along the shore. It is marked according to note 13.[1] The reference mark is 6.10 meters north (magnetic).

Alder (Lincoln County, J. W. M., 1914). Across the bay and about one-half mile east of Mill 4 railroad station, on a mud point covered with water-logged limbs of trees. The station is marked according to note 13.[1] The reference mark is 3.66 meters south (magnetic).

Soap (Lincoln County, J. W. M., 1914). Across the bay and about one-fourth mile southeast of the old Montgomery place, on a round soapstone point at the high-water mark. The station is marked according to note 13.[1] The reference mark is 2.44 meters south (magnetic).

Grass (Lincoln County, J. W. M., 1914.) Near the middle of the marsh, between the current jetty and Mill 4. The station is marked according to note 13.[1] The reference mark is 5.49 meters north (magnetic).

Apple (Lincoln County, J. W. M., 1914). On the west side of the bay, near an apple tree in front of the old Montgomery place. It is marked according to note 13.[1] The reference mark is 5.49 meters west (magnetic).

Dark (Lincoln County, J. W. M., 1914). On a point covered with alder trees, directly across the bay from the old Montgomery place, a few feet below the high-water mark. The station is marked according to note 13.[1] The reference mark is 6.40 meters east (magnetic).

Field (Lincoln County, J. W. M., 1914). On the east side of the bay, just across from the jetty light, and a few meters south of a cleared field. The station is marked according to note 13.[1] The reference mark is 6.10 meters east (magnetic).

Dune (Lincoln County, J. W. M., 1914). About one-fourth mile north of the Montgomery house, on a pile of sand dumped by dredges about 30 meters from shore. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

Hump (Lincoln County, J. W. M., 1914). About 1½ miles south of Toledo, on the southwest side of the river, about 15 feet above high water, on the top of a small embankment by the railroad. The station is marked according to note 13.[1] The reference mark is 1.52 meters northwest (magnetic).

Dike (Lincoln County, J. W. M., 1914). About 1½ miles south of Toledo, on the northeast side of Yaquina River, about 3 meters from the high-water line, on top of a small dike formed when the river was dredged. The station is marked according to note 13,[1] except that the surface mark is set in a 1-inch iron pipe, and the whole is then set in concrete. The reference mark is 7.92 meters north (magnetic).

Flat (Lincoln County, J. W. M., 1914). About 1 mile south of Toledo, on the tide flats about 64 paces from the high-water mark. The station is marked by a standard disk station mark set in a 1-inch iron pipe 1 foot long, the whole being set in a pier of concrete 10 inches in diameter and 2½ feet deep. There is a standard disk reference mark 3.05 meters east (magnetic).

High (Lincoln County, J. W. M., 1914). On the west side of the river, about 1 mile below Toledo, on a hill just above the railroad tracks, 6 paces back from the railroad fence and 40 feet above the high-water mark. The station is marked according to note 13,[1] except that the surface mark is set in a 1-inch iron pipe. The reference mark is 7.92 meters east (magnetic).

Saw (Lincoln County, J. W. M., 1914). About one-half mile south of Toledo, near an old sawmill and in the yard belonging to Mr. Altery. The station is marked according to note 13.[1] The reference mark is 7.92 meters east (magnetic).

Launch (Lincoln County, J. W. M., 1914). On the tide flats near the Toledo launch works. The station is marked according to note 13.[1] The reference mark is 15.24 meters south (magnetic).

City (Lincoln County, J. W. M., 1914). In the city of Toledo, close to the city dock, also on a line with the extension of the principal street of the city on an embankment about 25 feet above high water, between the railroad track and the river. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

Last (Lincoln County, J. W. M., 1914). About one-fourth mile west of the city dock in Toledo, on a mud dike near the water and about 100 meters southeast of a railroad trestle. The station is marked according to note 13.[1] The reference mark is 7.32 meters south (magnetic).

Sea (Lincoln County, J. W. M., 1914). On a sand knoll on the seacoast about midway between the south jetty and the old life-saving station. The station is marked according to note 13,[1] except there is no reference mark.

Nye (Lincoln County, J. W. M., 1914). Near that part of Newport called Nye Beach, on a sand hill about 300 meters back from the coast and about one-half mile north of the old Yaquina tower. The station is marked according to note 13,[1] except there is no reference mark.

Shade (Lincoln County, J. W. M., 1914). Across the bay and about southwest from the old Oneatta sawmill, at the high-water mark, and about 6 meters from the foot of the bluff. The station is marked by a 1-inch galvanized iron pipe 1 foot long set in a bed of concrete 2 feet deep, resting on hardpan.

Stream (Lincoln County, J. W. M., 1914). About one-half mile southeast of the Toledo city dock, on the tide flats on the north side of the river. The station is marked according to note 13,[1] except there is no reference mark.

[1] See pp. 81 and 82.

HECETA HEAD TO SIUSLAW RIVER.

PRINCIPAL POINTS.

Spur (Lane County, J. S. H., 1908). On the south side of Siuslaw River, 1½ miles upstream from Florence, on the north slope, and about 90 meters east of the highest point of the ridge. A line of sight was cleared to the south and several to the north and northwest, and these will serve to locate the general locality. The station is marked 15 inches below the surface by a cross marked on the bottom of a bottle and at the surface by a standard disk station mark set in a rock. There is a blazed fir tree, 8 inches in diameter, distant 8.74 meters S. 91° W. magnetic and a blazed willow tree 6 inches in diameter distant 3.29 meters N. 83° E. magnetic.

Cannery Hill (Lane County, L. A. S., 1883; 1908). On a chaparral covered sand hill about 120 meters east of an old cannery and sawmill and near the western edge of the summit. The station is marked by a drill hole in a piece of the backbone of a whale buried 2 feet and at the surface by a standard disk station mark set in a rock. The two reference marks are three-eighths-inch brass bolts cemented in rock. One is west 8.30 meters and the other is northeast 8.24 meters.

Sugar Loaf 2 (Lane County, J. S. H., 1908). On the north side of the river, three-fourths mile east of the outer point, 50 meters back from the top of the bluff, on a round topped sand-hill covered with brush. The station is marked according to note 11.[1] One reference mark is distant 5.32 meters in azimuth 6° 06′ and the other is distant 5.56 meters in azimuth 263° 17′.

Green (Lane County, J. S. H., 1908). About 2 miles north of east of Florence. There is a long ridge of hills about 275 meters east of a road, and it is on the highest part of the one farthest north that the station is located. The station is marked according to note 11.[1] One reference mark is distant 6.80 meters in azimuth 175° 35′ and the other is distant 6.27 meters in azimuth 253° 48′.

Snag (Lane County, J. S. H., 1908). About 2½ miles northeast of Heceta Lighthouse, about 60 meters from the summit of a long sloping bald ridge covered with fern and scattering snags. The station is marked according to note 11.[1] One reference mark is distant 8.03 meters in azimuth 27° 39′ and the other is distant 8.87 meters in azimuth 301° 26′.

Loaf (Lane County, J. S. H., 1908). About 1 mile northeast of Heceta Lighthouse, on a small sand hill covered with brush, about 150 meters south of another sand hill and about 115 meters east of the road. The station is marked according to note 11.[1] One reference mark is distant 5.78 meters in azimuth 286° 01′ and the other is distant 6.81 meters in azimuth 158 °26′.

Plateau (Lane County, J. S. H., 1908). About 4 miles northeast of Heceta Lighthouse, near the southeast corner of a large flat-topped hill, about 15 meters from where it begins to break on the east side. The station is marked according to note 11,[1] except the surface mark is a drill hole in a stone. One reference mark is distant 8.46 meters S. 8° E. magnetic and the other is distant 8.87 meters S. 58° W. magnetic.

Heceta (Lane County, J. S. H., 1908). About one-fourth mile northeast of Heceta Lighthouse, on the highest bald hill in the vicinity, about 6 meters west of the highest point of the hill and about 2 feet lower in elevation. The station is marked according to note 11.[1] One reference mark is distant 7.62 meters in azimuth 52° 59′ and the other is distant 7.02 meters in azimuth 9° 54′.

Turn (Lane County, J. S. H., 1908). On the high bluff about 550 meters southeast of Heceta Lighthouse, on the north slope of the ridge about 8 meters from the top. The station is marked according to note 11.[1] One reference mark is distant 7.19 meters in azimuth 243° 18′ and the other is distant 6.69 meters in azimuth 7° 26′.

Tree (Lane County, J. S. H., 1908). About 900 meters east of Heceta Lighthouse, and 75 meters from the road. The signal was a tree wrapped with cloth and the point sighted upon and located was projected to the ground and is marked 14 inches below the surface by a drill hole in a rock and at the surface by a drill hole in another rock. There is a blazed stump of a snag southeast 3.3 meters, and a blaze on the east side of the signal tree is distant 1.04 meters.

Head (Lane County, J. S. H., 1908). On the south slope of the bald hill 46 meters northeast of Heceta Lighthouse, 2.7 meters east of a fence, 6.1 meters east of the edge of the bluff, and 5.5 meters south of the edge of the bluff. The station is marked according to note 11.[1] One reference mark is distant 7.84 meters in azimuth 38° 25′ and the other is distant 6.64 meters in azimuth 275° 13′.

UMPQUA RIVER.

PRINCIPAL POINTS.

Wind (Douglas County, J. S. H., 1908). On the high sand hill one-half mile northwest of the life-saving station. The station was only marked temporarily by a stake driven in the sand.

Bench (Douglas County, J. S. H., 1908). On a sandstone bluff, 135 meters below the site of the old cannery, and opposite the life-saving station, 9.5 feet above mean low water. The station is marked by a brass bolt set in the sandstone bluff with cement. The letters "U. S. E." and "B. M." are marked in the cement around the station. The station was established by the United States Army Engineers as a reference bench mark for a tide gauge.

Brushy Hill 2 (Douglas County, J. S. H., 1908). On the highest part of a brush-covered hill on the north side of the Umpqua River, and about 4 miles west of Gardiner. The station is marked 3 feet underground by a standard

[1] See pp. 81 and 82.

disk station mark set in stone and at the surface by a drill hole in the end of a large, long rock. For a reference mark there is a drill hole in a rock buried flush with the surface distant 8.72 meters in azimuth 273° 31′.

Cab (Douglas County, J. S. H., 1908). About 1½ miles northwest of the Umpqua Life-Saving Station, 45.7 meters south and 9.1 meters east of the upper life-saving station lookout cabin. The station is marked according to note 11,[1] except there are no reference marks.

Sand hill 2 (Douglas County, J. S. H., 1908). On the westerly slope of the sand hill close to the bank of the Umpqua River, 2 miles upstream from the life-saving station and 1 mile south of Florence stage landing. The station was only marked temporarily by a stake in the sand.

Beach (Douglas County, J. S. H., 1908). On a small knoll on the sand beach about 320 meters north of the mouth of the Umpqua River, and about 1,100 meters west of the life-saving station, and 91 meters east of the lower life-saving station lookout cabin. The station is marked according to note 11,[1] except there are no reference marks.

COOS BAY.

PRINCIPAL POINTS.

Mill (Coos County, J. S. H., 1906). On a prominent hill or bluff in a suburb of Marshfield known as Kittyville, in front of and about 100 meters distant from a large, white house, and northwest of a mill and shipyard. The station is marked by a copper bolt set in a cut stone 3 feet underground and at the surface by a standard disk station mark set in cement in a cut stone. The reference marks are one-half inch copper bolts driven in large stumps, one distant 2.69 meters in azimuth 21° 02′ and the other is distant 10.10 meters in azimuth 128° 04′ 27″.

White Point 3 (Coos County, J. S. H., 1906). On the outer extremity of White Point, 2.6 meters from the edge of the point in the direction of Marshfield, 1.4 meters from the edge of the bank to the northward, and 50 meters northwest of Timmerman's house, and 20 feet above high water. The station is marked by a hole drilled in a rock buried 2 feet and at the surface by a standard disk station mark set in a cut stone.

Pierce (Coos County, J. S. L., 1863; 1906). On the top of the bluff on the south side of Pierce Point. The station is marked by a drill hole in a stone buried 1.3 feet below the surface and directly over this is a standard disk station mark set in a stone 12 inches square and 8 inches deep. There is a blazed tree distant 6.45 meters just south of the line to Capt. Dryden's house, and another one inshore of the line to Crawford's house, distant 10.91 meters.

Porter (Coos County, E. F. D., 1889; 1906). On the summit of the knoll just back of the California Lumber Co.'s mill. Large water tanks are located on the north side of the same knoll. The station is marked by a hole drilled in an irregular shaped stone buried 1½ feet and the surface mark is a standard disk station mark set in a stone 12 inches square by 10 inches deep. There is a copper nail driven 1 inch from the top of the largest water tank distant 4.19 meters, and a copper nail in a blazed stump, the only one on the knoll, distant 1.96 meters.

Dewey (Coos County, J. A. L., 1862; 1889). On the top of a small point forming the southern limit of a bight and just back of Dewey Rock. The station is marked by a drill hole in a stone 1½ feet below the surface and by 3 stubs with copper tacks distant 1.83 meters.

Mabry (Coos County, J. S. L., 1862; 1889). On the eastern side of the bay opposite North Bend Point, on a small nearly level spot about 35 feet above high-water mark. The station is marked by a drill hole in a stone 1½ feet below the surface. There is an old pine stump about 3 meters from the station at the edge of the bluff.

North Bend 2 (Coos County, E. F. D., 1889). About 50 meters below the northeast extremity of North Bend Point. The station is marked by a drill hole in a stone. There is a large blazed pine tree 6.77 meters inshore and another one is north 14.95 meters.

Russell (Coos County, J. S. L., 1862; 1889). On top of a bluff forming the eastern point of the entrance to North Slough. The point is covered with timber and heavy underbrush. The station is marked by a drill hole in a stone 1.3 feet below the surface. There is a copper nail in a blazed stump distant 10.29 meters and a stump of the edge of the bluff is distant 2.59 meters.

North Slough 89 (Coos County, E. F. D., 1889). On a low sand spit on the west side of the entrance to North Slough. The station is marked by a drill hole in a stone 3 feet below the surface and at the surface by a wooden block 12 inches square with a copper nail for the station mark. On account of the drifting sand the marking probably is not permanent.

Simpson (Coos County, J. S. L., 1862; 1889). On the top of the bluff on the west end of the point known as North Bend. The station is marked by a drill hole in a rock 1.6 feet below the surface. There are 3 stubs with copper tacks in the top distant 1.83 meters from the station, two are in a line parallel with the top of the bluff and the other is at right angles inshore.

Pony (Coos County, J. S. L., 1862; 1889). On Pony Point on a narrow belt of open ground lying between the high-water mark and the edge of the woods, on a small mound near a very small rivulet. The station is marked by a drill hole in a stone 1.1 feet below the surface. There are 3 stubs with copper tacks distant 1.83 meters.

North Slough (Coos County, J. S. L., 1862).—Lost.

Ridge (Coos County, J. S. L., 1863). On the drifting sand hills of the shore of the bend. The station is marked by a cross on a stone 1.2 feet below the surface; over this is a block of wood with a drill hole to mark the center.

Hutchinson (Coos County, J. S. L., 1862).—Lost.

[1] See pp. 81 and 82.

Tophet (Coos County, J. S. L., 1862; 1863). On the straight shore line south of Pony Point. The station is a hole drilled in the top of a stump 1 meter from the high-water mark.

Henderson (Coos County, J. S. L., 1861; 1863). On the highest of a group of small sand hills forming the northern boundary of the small prairie on which Henderson's house is located. The station is marked by a cross on a flat stone 1.6 feet below the surface. Three stakes set around the station are each distant 1.83 meters.

Cemetery (Coos County, J. S. L., 1861; 1889). Near the first open spot north of the highest part of the bluff. The station is marked by a hole drilled in a stone. There are 3 stubs around the station with copper tacks in the top distant 1.83 meters.

Coos Bay north base (Coos County, J. S. L., 1861; 1863). On the west side of the bay opposite Empire City, 20 paces from the high-water mark. The station is marked by a copper bolt set in a section of a spruce log 3 feet long and 26 inches in diameter, projecting 2 inches above the surface of the ground. There are three stakes around the station each distant 1.83 meters.

Coos Bay south base (Coos County, J. S. L., 1861; 1863). On the west side of the bay on a slight raise in the land belonging to Mr. Henderson. The station is marked by a copper bolt set in a block of wood 3½ feet long 26 inches in diameter set level with the surface. There are three stakes around the station each distant 1.83 meters.

Telegraph (Coos County, J. S. L., 1862; 1863). On the highest part of the bluff immediately north of Empire City. The station is marked by a nail in the bottom of a hole drilled in the top of a stump.

Ridge 2 (Coos County, E. F. D., 1889). About 130 meters from the shore on a timbered ridge about 2.5 meters wide, running northwest and southeast, 275 meters northeast of the old Henderson house, and about 80 feet above the high-water mark. The station is marked by a drill hole in a stone 2 feet below the surface. There is a large pine tree on the eastern slope of the ridge distant 1.63 meters north-northeast and another tree about 1 meter from the edge of the ridge with a similar mark distant 11.48 meters northwest.

Hutchinson 2 (Coos County, E. F. D., 1889). On a small ridge of land at the edge of a marsh. The station is marked by a bottle buried neck down 2½ feet below the surface and over this is a stub with a copper tack to mark the station.

Pest (Coos County, E. F. D., 1889). On the north side of the bay directly opposite Empire City on the highest sand hill in the vicinity about 365 meters back of the pesthouse. The station is marked by a drill hole in a rock 2 feet below the surface.

Empire 2 (Coos County, E. F. D., 1889). Lost.

Midway (Coos County, E. F. D., 1889). On the east side of the bay, about midway between Empire City and Pigeon Point and about 230 meters southwest of Girouni's house at the mouth of Second Creek, on a small sand ridge about 6 meters from the high-water mark and about 12 feet above it. The station is marked by a hole drilled in a stone buried 2 feet below the surface.

Grove (Coos County, E. F. D., 1889; 1909). On the north shore of the bay on the summit of hill at the eastern edge of the first grove of timber above the entrance. The station is marked by a drill hole in a rock 2½ feet below the surface. There is a blazed fir tree marked with a copper tack southwest 12.74 meters, a tree with a similar mark northwest 19.87 meters, and a tree with the same mark south 4.6 meters.

Pigeon 2 (Coos County, E. F. D., 1889; 1909). The station is marked by a bottle buried 3 feet below the surface; over this is a wooden stake with a copper tack.

North Spit (Coos County, E. F. D., 1889). On the southeast extremity of the dry sand spit on the north side of the entrance to the bay, about 25 meters from the high-water mark on the bay side, and about 10 feet above high water. The station is marked by a bottle buried neck down 4 feet below the surface; over this is a cedar stake 4 feet long with a copper tack in the top flush with surface.

Fossil 2 (Coos County, E. F. D., 1889). On the point forming the northeast end of Rocky Point. The station is marked by a drill hole in a rock 3 feet below the surface. There is a large blazed fir tree to the east of the station.

Coos Head 2 (Coos County, E. F. D., 1889). Lost.

Empire 3 (Coos County, J. S. H., 1909). Within 3 paces of the upper edge of the bluff back of the old mill, and about 45 meters to the northeast of a small ravine. This part of the bluff is clear of timber. The station is marked by a pipe driven into the ground and surrounded by concrete.

Jetty (Coos County, J. S. H., 1909). On the jetty on the west side of Coos Bay, about 400 yards below the Government works. The station was not permanently marked.

Ocean (Coos County, J. S. H., 1909). On the sand spit on the west side of Coos Bay, some 200 yards from the ocean. The station was temporarily marked, but no attempt was made to make the mark permanent.

Coos Head 3 (Coos County, J. S. H., 1909). The station is marked by a pipe projecting about 1 foot above the ground There is a blazed snag 3 feet in diameter with a nail driven in the blaze 5.25 meters south, and a similar blaze and nail on a snag 2½ feet in diameter, distant 5.86 meters east.

Crawford 2 (Coos County, E. F. D., 1889). Lost.

Timmerman (Coos County, E. F. D., 1889; 1890). On the narrow neck of land dividing the bay from Isthmus Slough, about 365 meters southeast of the Methodist church, and about 210 meters east of the Town Site Co.'s office. The station is marked by a drill hole in the end of a brick buried 1½ feet. There is a large blazed fir tree 15.30 meters west.

White Point 2 (Coos County, E. F. D., 1889). Lost.

Isthmus 2 (Coos County, E. F. D., 1889). On the outer extremity of the marshy point forming the north side of the entrance to Isthmus Slough. The station is marked by a drill hole in a stone 2 feet below the surface. There are 3 stakes around the station northwest, southwest, and southeast, distant 1.83 meters.

Marsh (Coos County, E. F. D., 1889). On a low timbered point about halfway between Marshfield and Eastport and about 14 meters from the edge of the hard land. The station is marked by a drill hole in a stone buried 2 feet. There are 3 stubs with copper tacks distant 1.83 meters from the station, 2 in line and the other at right angles.

Coos (Coos County, J. S. L., 1863; 1889). On the point of marsh dividing Kitchen Slough from Coos River. The station is marked by a drill hole in a stone 1.2 feet below the surface. There are 3 stubs with copper tacks in the top each distant 1.83 meters.

Grass (Coos County, E. F. D., 1889). On the edge of the marsh to the eastward of the high wooded point on the west side of the mouth of Catching Slough and 3 meters south of a small slough running northwest toward the dyke. The station is marked by a drill hole in a stone 1 foot below the surface. There are 3 stakes marked with copper tacks distant 1.83 meters.

Coos River Hill (Coos County, E. F. D., 1889). On the southern edge of the summit of the first hill on the north side of the Coos River, about 2 meters east of a boundary fence running north and south across the hill, and about 400 meters southeast of McIntoshes' house. The station is marked by a drill hole in the end of a brick buried 2 feet. There is a blazed fir tree, 4½ feet in diameter, northeast 15.94 meters, and a small blazed pine tree southeast 11.43 meters.

Loggie (Coos County, E. F. D., 1889). On the first high point on the east side of Catching Slough, on the western slope about 80 feet above the marsh. The station is marked by a drill hole in a stone 1 foot below the surface. There is a blazed stump northwest marked with a copper tack distant 12.446 meters, and a stump with a similar mark is distant 14.304 meters southeast.

Ross (Coos County, E. F. D., 1889). On the slope of the first bare hill on the west side of Catching Slough about 1 mile above its mouth, and on the north side of Ross Slough, about 275 meters south of the Southern Oregon Co.'s water tank, and about 50 feet above tidewater. The station is marked by a drill hole in a stone 1½ feet below the surface with some pieces of brick around the stone. There is a large blazed fir tree with a copper tack to the southward distant 13.20 meters.

Violet (Coos County, J. S. L., 1862; 1889). On a bare green knoll on the northeast side of Pony Point. At the edge of the woods southwest of the station there is a large pine tree blazed and marked with a copper nail distant 28.04 meters. In the direction of the first point up the bight on the west side is a depression in the highest part of this point. The center of this depression is distant 12.94 meters.

Branch (Coos County, J. S. L., 1863; 1889). On the first point south of Pony Point, on the west side of Pony bight, distant from the shore line of the marsh 3.9 meters. The largest pine tree in the vicinity is blazed and marked with a copper nail, distant 6.89 meters in a prolongation of the line to Russell Point. The station is probably marked by a drill hole in a stone underground. There are three stubs with copper nails in the top, distant 1.83 meters, one in azimuth 146° 45′, the second in azimuth 326° 45′, and the third in azimuth 236°.

Haynes (Coos County, J. S. L., 1862; 1889). On a small tongue making off from the bluff on the southeast face of Haynes Point. The station is marked by a drill hole in a stone 1.35 feet below the surface. There is a large blazed pine tree, marked with a copper nail, leaning over the eastern bank, distant 6.42 meters, and a small blazed pine tree on the west bank, distant 2.69 meters.

Charleston 2 (Coos County, E. F. D., 1889). On a bluff at the south side of the entrance to Coos Bay. The station is marked by a bottle buried 2 feet and at the surface by a wooden stake with a copper tack. There is a blazed cedar tree distant 12.5 meters.

Bluff (*U. S. E.*) (Coos County, U. S. E., 1907). The station is marked according to note 14.[1]

Curve (*U. S. E.*) (Coos County, U. S. E., 1907). The marking of this station is unknown.

Grass Mound (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

Nelson (*U. S. E.*) (Coos County, U. S. E., 1907). The station is marked according to note 14.[1]

Midway Point (*U. S. E.*) (Coos County, U. S. E., 1907). The station is marked according to note 14.[1]

Marsh (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

Empire Dock (*U. S. E.*) (Coos County, U. S. E., 1907). The marking of this station is not known.

Sand Beach (*U. S. E.*) (Coos County, U. S. E., 1907.) This station is marked according to note 14.[1]

Mabry (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

Lookout Point (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

Jarvis (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

Pony Point (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

Henderson (*U. S. E.*) (Coos County, U. S. E., 1907). The station is marked according to note 14.[1]

Island (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

Hay Barn (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

North Bend (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

Stave Mill (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

Crawford Point (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

[1] See pp. 81 and 82.

Barker (Coos County, E. F. D., 1889). On a bluff point on the east side of South Slough, directly opposite the entrance to the bay, about one-half mile south of Rocky Point Jetty, 4 feet from the edge of the bluff, and 50 feet above the tide. The station is marked by a drill hole in a flat stone buried 2 feet below the surface. There is a blazed spruce tree, marked with a copper tack, to the eastward, distant 2.80 meters, and another spruce tree, marked in the same manner, to the northward, distant 5.42 meters.

PORT ORFORD.

PRINCIPAL POINTS.

Arch Rock (Curry County, A. W. C., 1869). On the highest of the rocks composing the Orford Reef, with a large arch running through it from the north to the south, on the eastern face of the rock, on the top of the first bench, 51 feet above sea level. The station is marked by a hole 3 inches square and 3 inches deep drilled in hard rock.

Blanco (Curry County, A. W. C., 1869). Lost.

Bluff (Curry County, A. W. C., 1869). On the edge of the bluff where the curve in the shore line from Cape Blanco joins the main trend. The station is marked by a bottle buried neck down 3 feet below the surface. Three stakes bearing north, south, and west magnetic are distant 1.83 meters.

Port Orford north base (Curry County, A. W. C., 1869). Lost.

West (Curry County, A. W. C., 1869). Lost.

Wilson (Curry County, A. W. C., 1869). Lost.

Rocky Point (Curry County, A. W. C., 1869). Lost.

Best Rock (Curry County, A. W. C., 1869). On the largest of the rocks of Orford Reef, the top of which presents a rounded appearance from all directions. The station is a little to the south of the middle of the rock, 143 feet above sea level, and is marked by a drill hole in the rock 3 inches deep covered with a great cairn of loose stones.

Point Orford Astronomic (Curry County, A. W. C., 1869). Lost.

Round (Curry County, A. W. C., 1869). Lost.

Pine Hill (Curry County, A. W. C., 1869; 1890). On the highest point of the long grassy ridge running from the north end of the lagoon above Port Orford to within one-half mile of Elk River, about midway between the lake and the end of the ridge, and 175 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark. The following magnetic azimuths and distances to blazed trees are given: S. 16° E. 15.0 meters; N. 9° W. 10.30 meters; N. 50° 30′ W. 16.12 meters.

Arch Rock Summit. (Curry County, A. W. C., 1869). On the summit of the highest of the rocks composing the Orford Reef with a large arch running through it north and south, 149 feet above sea level. The station is marked by a drill hole in the hard rock.

Port Orford south base (Curry County, A. W. C., 1869; 1907). On a large isolated rock, directly at the foot of the trail leading from Port Orford to the west beach, the stream forming the outlet of Garrison Lagoon runs past the southeast side of the rock. The station is in the center of the oblong space, 30 by 60 feet, forming the top of the rock, and is marked by an inverted wine bottle buried 2 feet below the surface, and at the surface by a standard disk station mark.

SAN SEBASTIAN TO CHETKO RIVER.

PRINCIPAL POINTS.

Dolan (Curry County, A. W. C., 1873; 1907). On a high knoll one-half mile south of the point where the road crosses Myers Creek, a little southwest of the highest point of the hill. The station is marked by a stone with a cross on it buried 3 feet and the surface mark is a stone with a 1-inch drill hole set level with the surface. The reference mark is on the highest point except for a mound of earth 6 feet to the north, 2 feet east of the edge of a hole and in range with the station mark and the largest rock on the beach. The reference mark is a one-half-inch drill hole in a rock set level with the surface, distant 8.53 meters in azimuth 262° 15′.

Red Rock (Curry County, A. W. C., 1873; 1907). The station is located in a depression in a large bunch of rocks on a ridge bare on the south side and top, but timbered on the north side, about 3 miles south of the point where the road crosses the Pistol River. The station is marked by a bottle buried 1 foot and at the surface by a stone 12 inches square and 8 inches deep with a drill hole in the top. There is a cross on a flat rock higher than the station, distant 2.99 meters in azimuth 208° 43′, a drill hole in the top of a ledge of rock lower than the station, distant 41.462 meters in azimuth 73° 06′, and a drill hole in a point of rock distant 3.48 meters in azimuth 207° 51′.

Sundown (Curry County, A. W. C., 1873; 1907). On the western end of a ridge about 3 miles due east of Pistol River, on an open space covered with dead brush, with timber directly to the east. See the description of *Sundown 2* and the list of geographic positions. The station is marked by a glass bottle buried 3 feet below the surface.

Crooks Point (Curry County, A. W. C., 1872). On a bare wind-swept sand hill on the point of land from which Macks Reef starts. Directly opposite the station is a high rock. The station is marked according to note 9,[1] except the surface mark was omitted.

San Sebastian (Curry County, A. W. C., 1873). On the highest point of the long ridge or backbone which forms the main portion of Cape San Sebastian, 30 meters south of a split or gap in the ridge. The station is marked according to note 15.[1] There is a rocky point due north 23 meters and one due south, distant 6 meters.

Cove (Curry County, A. W. C., 1873). On the summit of a hill forming part of a long ridge leading up from Hunter Cove to Cape Sebastian, about opposite Island Rock. The station is marked according to note 15.[1] The station was looked for in 1907 but could not be found.

Cove Island (Curry County, A. W. C., 1873). On the highest part of the large island lying in Hunters Cove. The station is marked according to note 15.[1]

Schumaker (Curry County, A. W. C., 1873). On a prominent hill north of Dolan's house and south of the cove. There are a few scattering fir trees on the northern flank of the hill. The station was marked according to note 15.[1]

Fairview (Curry County, A. W. C., 1873). Close to the forest edge on the long ridge that runs back from Cape San Sebastian. The station is marked according to note 15.[1]

Crooks Hill (Curry County, A. W. C., 1872). On the first mountain south of Pistol River, on the prominent ridge known as Crooks Hill, about midway down the ridge on a prominent isolated bare knoll. The station is marked according to note 9.[1]

Bluff (Curry County, A. W. C., 1873; 1907). On the highest part of a very prominent bluff, the sea face of which is a precipice of rock directly opposite the mouth of the Pistol River. The station is marked according to note 15.[1]

Loma (Curry County, A. W. C., 1873). On a loma or isolated hill readily picked out from the surrounding hills. The station is marked according to note 15.[1] It is not likely that the station can be recovered.

Pistol River (Curry County, A. W. C., 1873). Near the brow of the hill, on the bluff on the north bank of the Pistol River opposite the prominent old shell mound. The station is marked according to note 15.[1]

Crook (Curry County, A. W. C., 1873). On an isolated loma or rounded hill at the right of the point where the trail climbs the bluff after leaving the river. The station is marked according to note 15.[1] It probably can only be recovered by means of other triangulation.

Dune (Curry County, A. W. C., 1873). The station is located on a sand dune and is marked according to note 15.[1]

Sand Flower (Curry County, A. W. C., 1873). On a sand dune partially grassed over, north of Crooks Point and about three-fourths of a mile from the rocks off that point. The station is marked according to note 15.[1]

Lookout (Curry County, A. W. C., 1873). On the brow of a hill which has a heavy fir forest on the north and a sand slide on the east side. The hill commands a view of the windings of Pistol River. The station is marked according to note 15.[1]

Macks Point (Curry County, A. W. C., 1872). On the second point south of Pistol River, the first point south of Crooks Point, directly opposite Macks Rock, about 4.6 meters inland from the bluff. The station is marked according to note 9,[1] except the surface mark was omitted.

Ridge Knob (Curry County, A. W. C., 1872). About one-fourth mile from the beach on the first prominent knoll bare of timber, on the highest part of the knoll. The station is marked according to note 9.[1]

Snodgrass (Curry County, A. W. C., 1872). On top of a bare hill which is west of the Snodgrass house, very near to the steep western face. The station is marked according to note 9.[1]

Rocky Prairie (Curry County, A. W. C., 1872). On the highest part of a hill which is covered with low brush on the north side, and has a small slide of red earth on the south. It is the only hill in the vicinity commanding a view of the coast line and up and down the country. The station is marked according to note 9.[1]

Burnt Point (Curry County, A. W. C., 1872). On the first prominent point below the now deserted Hous-ta-nat-na Indian village, on the highest point to the seaward of two peculiar round hills. The station is marked according to note 9.[1]

Smith Hill (Curry County, A. W. C., 1871; 1872). On the highest part of the hill rising directly behind Smith's house, 717 feet above sea level. The station is marked according to note 9.[1]

Bush Mound (Curry County, A. W. C., 1872). On the highest point of the hill to the west of the point where the coast trail enters the timber. The hill is rocky and bare on the seaward side but covered with timber on the opposite side. The station is marked according to note 9.[1]

Red Mound (Curry County, A. W. C., 1872). On a range of hills about 2½ miles from the coast, on the center and the highest part of the prominent mountain that shows reddish color from the sandstone on its surface. The station is marked according to note 9.[1]

Bellevue (Curry County, A. W. C., 1871; 1872). On top of the high hill rising out of the plateau above Cresswell's, west of the trail running over the mountain to Rogue River. The station is marked 3 feet below the surface by a glass bottle and at the surface by a drill hole filled with lead in a stone block. Three stakes each 0.91 meter distant bear north, south, and east magnetic.

Sister Knob (Curry County, J. J. G., 1871; 1872). In the center of the eastern one of the two remarkable conical hills 385 feet above sea level. The station is marked 3 feet below the surface by a bottle and at the surface by a drill hole filled with lead in a stone block. Three stakes bear north, east, and south (magnetic) distant 0.91 meter.

Black Mound (Curry County, A. W. C., 1872). On the first prominent mountain of the range north of the Chetco River, about 6 meters south of the trail that leads over the mountain top. The station is marked 2 feet underground by a glass bottle and at the surface by a drill hole filled with lead in a rough stone. There are three redwood stakes, one each north, south, and east magnetic.

High Mound (Curry County, A. W. C., 1870). On a high mound about 2 miles north of the Chetko River, directly opposite the island rock, known as Whales Head. The sea face of the mound is perpendicular and the mound itself is

[1] See pp. 81 and 82.

220 feet above the highwater mark. The station is marked according to note 15,[1] except there is as a surface mark a stone block with a drill hole in the center filled with lead.

Miller (Curry County, A. W. C., 1870). On the long ridge coming down on the north side of the Chetko River, directly in the trail leading up the face of the ridge, 640 feet above sea level. The station is marked according to note 15.[1]

New (Curry County, A. W. C., 1872). On the highest part of the ridge, on the right of the trail from Whales Head to Tommys Creek, and about 300 meters from the deep canyon of Tommys Creek. The station is marked according to note 9,[1] except the surface mark is missing.

Head Island (Curry County, A. W. C., 1871). On the highest point of the seaward one of the two large islands lying off Whales Head, 123 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

Trail (Curry County, A. W. C., 1871). Close to the trail on the righthand side just at the point where it commences to descend toward Whales Head. The locality probably can be determined from the stumps left from opening the line of sight. The station is marked according to note 9,[1] except there is no surface mark.

Sand Hill (Curry County, A. W. C., 1871). On the high hill forming the end of the long ridge making down beyond Bellevue, 497 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

Cresswell (Curry County, A. W. C., 1871). Very near the edge of the bluff beyond Cresswell's house. The station is marked according to note 9,[1] except there is no surface mark.

Barnacle Rock (Curry County, A. W. C., 1871). On a flat rock northeast of a high conical rock directly off Sand Hill. The only mark is a hole cut in the rock for the foot of the center pole.

Elk (Curry County, A. W. C., 1872). On the highest part of a small conical hill on the face of the ridge. The station is marked according to note 9.[1]

Thomas Hill (Curry County, A. W. C., 1872). On the highest point of the hill bare of timber and is marked according to note 9,[1] except the surface mark was omitted.

Deep Gulch (Curry County, A. W. C., 1872). On the extreme apex of a conical-shaped hill on the end of a very prominent point projecting into the sea, at the extreme end of the beach beyond Tommys Hill. The station is marked according to note 9,[1] except the surface mark was omitted.

Green Hill (Curry County, A. W. C., 1871). On a conical hill in the center of the plateau to the west of the stream making into the coast at Whales Head, 679 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

Seal Point (Curry County, A. W. C., 1872). On the highest part of a hill on a point about 1 mile north of Deep Gulch. It is the first hill north of a curious little basin surrounded by precipices. The station is marked according to note 9,[1] except the surface mark was omitted.

Thomas Point (Curry County, A. W. C., 1872). On the highest part of the point projecting the farthest toward the sea. The station is marked according to note 9,[1] except the surface mark was omitted.

Red Bush (Curry County, A. W. C., 1871). In the center of a knoll that rises out of the flat bench or plateau, 354 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

Lone Knob (Curry County, A. W. C., 1871). On a peculiar round hill on the plateau above Lone Ranch and 400 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

Sandy Point (Curry County, A. W. C., 1871). On top of a long sandy slide in the bank to the left of the point where the trail goes down to Lone Ranch. The station is marked according to note 9,[1] except there is no surface mark.

Acorn (Curry County, A. W. C., 1871). Northeast of Sister Knob on a round hill near the forest. The station is marked according to note 9,[1] except there is no surface mark.

Black Point (Curry County, A. W. C., 1871). On a low point covered with black bushes, near the bluff and about 190 feet above sea level. The station is marked according to note 15.[1]

Bench (Curry County, A. W. C., 1871). On the bank of the next stream beyond Flat Knoll, to the right of where the road runs down into the gulch, 290 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

Flat Knoll (Curry County, A. W. C., 1871). In the center of a knoll on top of the prominent hill beyond the little creek that the trail crosses beyond Low Point and 203 feet above mean low water. The station is marked according to note 9,[1] except there is no surface mark.

Low Point (Curry County, A. W. C., 1871). On the next prominent point beyond High Mound and beyond where the trail turns off to go to Lone Ranch, near the edge of the bluff, 158 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

Taylor (Curry County, A. W. C., 1871). On a rounded hill near the coast, west of the trail after it crosses the little stream where there is a little farmhouse and cattle yard. The station is marked according to note 9,[1] except there is no surface mark.

Hidden (Curry County, A. W. C., 1871). Northeast of High Mound, near the edge of the forest, behind several stony hills, and 350 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

Loma (Curry County, A. W. C., 1870). On a peculiar mound-shaped hill covered with small bushes about halfway between the trail and the forest-covered ridge beyond. The station is marked according to note 15.[1]

[1] See pp. 81 and 82.

CHETKO RIVER TO TRINIDAD HEAD.

PRINCIPAL POINTS.

North Chetko (Curry County, A. W. C., 1870). On a long point ending in rugged rocks north of the Chetko River. A trail leads from Mr. Miller's house toward the station, but in order to reach the station it will be necessary to descend to the beach and then again mount the rocks. The station is marked according to note 15,[1] except there is as a surface mark a roughly squared stone block with a drill hole filled with lead in the top.

Red Point (Curry County, A. W. C., 1870). About 20 meters from the edge of the bluff bank of a point, which shows red when seen from below, on the farm of Mr. Cooley and nearly opposite his house. The station is marked according to note 15,[1] except that it has as a surface mark a roughly squared stone block with a drill hole filled with lead.

Fence (Curry County, A. W. C., 1870). On Miller's farm about 55 meters west of the northeast corner of the orchard fence on a bench about 160 feet above the sea. The station is marked according to note 15.[1]

Cooley (Curry County, A. W. C., 1870). On the bluff ocean bank on the farm of Mr. Cooley. Follow the road toward Chetko until you come to the point where it descends the bank, then turn to the left, cross the fence, and the station will be found on the first projection south of the bank. The station is marked according to note 15.[1]

Pine Hill (Curry County, A. W. C., 1870). On the right side of the road going north, above where it takes an abrupt turn to go down toward the Chetko River, on top of a hill that is very steep toward the road. Cross the little gulch just before the fence corner and the station is just above. The station is marked according to note 15.[1]

Bare Ridge (Curry County, A. W. C., 1870). On the second bench of a long ridge ending in a conical hill, about 500 feet above the road and 580 feet above the sea. The station is marked according to note 15.[1]

North Winchuck (Curry County, A. W. C., 1870). On the edge of the bluff bank about one-fourth mile north of the Winchuck River. To reach it follow the line of fence down from the road that formerly marked the State boundary to the bluff edge and the station is about 100 meters south. It is marked according to note 15,[1] except there is as a surface mark a stone block with a drill hole filled with lead in the top.

Rocky Butte (Curry County, A. W. C., 1870). Near the center of the flat space on the top of a singular rock rising boldly from the even slope between the road and the sea on land owned by Mr. Otto. The station is marked according to note 15.[1]

Otto (Curry County, A. W. C., 1870). On the first top or bench of the ridge directly north of Mr. Otto's house, 100 feet above the road on the right side going north, and 280 feet above the sea. The station is marked according to note 15.[1]

Henderson (Curry County, A. W. C., 1870). About one-half mile beyond the Winchuck River. Going northward along the road there is a large rock on the left and beyond it the home of Mr. Henderson. The station is on the first bench of the mountain east and 500 feet above the road and about 700 feet above the sea. The station is marked according to note 15.[1]

Oregon-California Boundary Monument (Del Norte County, Cal., and Curry County, Oreg., A. W. C., 1870). The station was established by Daniel G. Major, United States land survey, in 1869, on the east side of the road about one-fourth mile south of the Winchuck River. It is 10 meters east of the road, about 2 meters west of the fence, and about 200 meters south of a barn belonging to Mr. Jackson and surmounted by a pair of elk antlers. The station is marked by a fir post about 4 feet high, roughly hewn on four sides about 5 inches square, set firmly in the ground and surrounded by a cairn of loose stones. On the west side it is marked "42 I 1869;" on the east "212 M 28 C;" on the south "C;" and on the north "O."

Northwest Seal Rock (Del Norte County, Cal., A. W. C., 1870). On Northwest Seal Rock, which culminates in a sharp apex. The station is on a sort of bench about 3 feet below the highest part. A natural cavity was widened to admit the foot of the signal and this is the only station mark. There are three iron spikes 2 inches in diameter driven around the station, used to hold the guy ropes.

Pyramid (Del Norte County, Cal., A. W. C., 1870). On the west side of the top, which is very small, of a conical hill covered with low bushes, directly north of the mouth of Smith River. The road runs between this hill and the end of the long ridge. The station is marked according to note 15,[1] with the addition of a square stone block, with a hole drilled in the center and filled with lead, used as a surface mark.

Peak (Del Norte County, Cal., A. W. C., 1870). On a conical peak north of Gilberts Creek. It is the highest bare peak seen from the road after crossing the creek. There are some fir trees immediately back and the nearest one was blazed and some tacks driven into the wood. The station was marked according to note 15.[1]

Cone Rock (Del Norte County, Cal., A. W. C., 1870). In the center of the top of a large cone-shaped rock lying off the coast between the mouth of the Winchuck River and Island Rock. A hole drilled for the signal is the only mark.

Boulder (Del Norte County, Cal., A. W. C., 1870). On the ridge north of Gilberts Creek. To reach the station follow the ridge up and cross a depression after the first summit is reached, then the station lies to the right on a flat-topped hill. The station is marked according to note 15.[1]

Bush (Del Norte County, Cal., A. W. C., 1870). Going north along the road across Gilberts Creek, on the other side of which lies a mountain with an arm extending toward the sea. The road sweeps around the base of this moun-

[1] See pp. 81 and 82.

tain and when near the bank passes close by a large rock; turning off here and mounting the face of the ridge, the station will be found on the first bench, marked according to note 15.[1]

Hillside (Del Norte County, Cal., A. W. C., 1870). On the right side of the road above the Yonkers farm, on the hillside near the pine forest, and 110 feet above the road. The station is marked according to note 15.[1]

Low Dune (Del Norte County, Cal., A. W. C., 1870). Near the center of a low sand dune, shifting in character, on the bluff bank opposite a large isolated rock on shore. The station is marked according to note 15.[1]

Island (Del Norte County, Cal., A. W. C., 1870). On the highest part and near the center of the large island rock lying off the mouth of Smith River. The station is marked according to note 15.[1]

Cone (Del Norte County, Cal., A. W. C., 1870). On a rounded grassy sand dune near the coast. The station is marked by a piece of stone one-half inch (probably foot) in diameter and 6 inches long shaped like a cylinder, with a hole bored in the top and filled with lead, set 3 feet below the surface. At the surface is a roughly squared stone with a hole drilled in it and filled with lead. Three stubs with copper tacks in the top of each were placed north, south, and east (magnetic) of the station, distant 0.91 meter.

Head (Del Norte County, Cal., A. W. C., 1870). On the end of the long ridge making down beyond Smith River, at the right of the road going north and 200 feet above it. The station is marked according to note 15,[1] with the addition of a square stone block, with a drill hole filled with lead in the top, as a surface mark.

Last (Del Norte County, Cal., A. W. C., 1870). On grassy ground on top of a bluff bank, north (?) of a large creek coming down from the hills. The station is marked according to note 15.[1]

Patch (Del Norte County, Cal., A. W. C., 1870). On the side of the hill near the edge of the forest, on the right of the road going north, on the farm of Mr. Yonkers and southeast from his house. The station is marked according to note 15.[1]

East (Del Norte County, Cal., A. W. C., 1870). On a spur making out from the mountain ridge above Smith River, 425 feet above mean low water. The station is immediately above some outcropping yellow rock which is visible from below the face of the ridge. The station is marked according to note 15,[1] with the addition of a square stone block with a drilled hole filled with lead as a surface mark.

Low Rock (Del Norte County, Cal., 1870). On the center of a low flat rock, the southern one of three, lying off the mouth of Smith River. The rock is about 12 feet high and when there is any swell the sea washes over it constantly. An iron bar, 4 inches square and 8 feet long, set in a square hole drilled in the solid rock marks the station.

Spur (Del Norte County, Cal., A. W. C., 1870). On the middle dune, which is covered with a green plant, on the end of a long ridge running down from Scott's house toward Smith River. The station is marked according to note 15.[1]

Great Sand Dune (Del Norte County, Cal., A. W. C., 1870). On a great sand dune and as the sand is loose and drifting it probably can not be recovered. The station is marked according to note 15.[1]

Indian (Del Norte County, Cal., A. W. C., 1870). On a low sand dune to the southward of a gap or low place in the line of sand dunes opposite the south end of the western arm of Lake Earl, about 100 meters from the high-water mark, with a few Indian huts below and to the north of it. The station is marked according to note 15,[1] except there is a roughly-squared block of blue sandstone, with a hole 1½ inches deep in the top filled with lead for a surface mark.

Eureka (Del Norte County, Cal., A. W. C., 1870). On a high sand ridge grassed over and forming the west side of the northeast arm of Lake Earl, about 100 meters from the lake edge. A few large firs grow on the side of the bank toward the lake. The station is marked by a bottle buried 3 feet below the surface, and at the surface by three stubs with copper tacks in the top of each, 0.91 meter, and bearing north, south, and east.

Lake End (Del Norte County, Cal., A. W. C., 1870). On a sand dune between high-water mark and the edge of the marsh at the northwest end of Lake Earl. The station is marked by a bottle buried 3 feet below the surface, and at the surface by three stubs with copper tacks in the top of each, distant 0.91 meter, and bearing north, south, and east.

Lake Earl north base (Del Norte County, Cal., A. W. C., 1870). Located about one-third of the way between T. A. Scott's lower ranch and the upper called Toutocket, between the northeast and northwest arms of Lake Earl, on a level grassy flat. A road from the lower to the upper ranch passes on the left, looking north, distant about 40 meters. The station is marked by a bottle buried 3 feet below the surface, and near the surface by a roughly-squared stone with a 2 inch hole drilled in it and filled with lead. A copper tack in the lead marks the station. Three stubs each with a copper tack in the top are distant 0.91 meter bearing north, south, and east.

Lake Earl south base (Del Norte County, Cal., A. W. C., 1870). On the west of the road and 71 paces northwest of a large post, and in line with the post and a willow copse to the westward. The station is marked by a bottle buried 3 feet below the surface, and at the surface by a square block of blue basalt, with a hole 1¼ inches in diameter and 2 inches deep filled with lead, with a copper tack set in the lead. Three stubs each with a copper tack in the top are distant 0.91 meter and bear north, south, and east.

Gravel (Del Norte County, Cal., A. W. C., 1870). On a little round sand knoll on the narrow ridge separating Lake Earl from the ocean. A bed of gravel comes up nearly to the station on the ocean side. The station is marked according to note 15.[1]

Burnt Ranch (Del Norte County, Cal., A. W. C., 1870). On the hill near the edge of the bluff going down to the slough, in the Indian village of Toutocket, sometimes called Burnt Ranch. The station it marked according to note 15.[1]

Ridge (Del Norte County, Cal., A. W. C., 1870). On a grassy knoll surrounded by a swamp, about midway between Scott's house and the northeast arm of Lake Earl. There are a few fir trees growing on the side of the knoll toward the lake. The station is marked according to note 15.[1]

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[1] See pp. 81 and 82.

Lake Mound (Del Norte County, Cal., A. W. C., 1870). On a round grassy knoll on the south side of Lake Earl opposite Scott's house and west of the Indian Rancherie. The Lake turns here with an arm to the east and south. The station is marked according to note 15.[1]

Squaw (Del Norte County, Cal., A. W. C., 1870). On a large mound on the west side of the eastern and southern arm of Lake Earl, a few feet north of the largest of several Indian huts, and south of some Indian graves. The station is marked according to note 15.[1]

Red Point (Del Norte County, Cal., A. W. C., 1870). On the low gravel flat between the marsh and the lake, on the east side of the eastern arm of Lake Earl, and on a point that forms the north side of the bight into which Jordans Creek empties. A quantity of red sorrel gives a ruddy hue to the point as seen from the opposite shore. The station is marked according to note 15.[1]

Swamp (Del Norte County, Cal., A. W. C., 1870). On low ground, overflowed in the winter, on the southeastern side of Lake Earl, on the left of the narrow passage leading into the mill. A few dwarf firs are between the station and the lake and behind the station is quite a mass of undergrowth. The station is marked according to note 15.[1]

Lake (Del Norte County, Cal., A. W. C., 1870). About midway between Lake Earl and the ocean, on the sand knoll on the north side of the narrow place where the lake approaches the ocean. The lake discharges through this narrow place in the winter. The station is marked according to note 15.[1]

Yank (Del Norte County, Cal., A. W. C., 1870). On a sand dune, the northern and eastern face of which is covered with fir trees, about 300 meters northwest of the house of a settler called Yank. The road to *Yank* passes at the foot of the dune. The station is marked according to note 15.[1]

Pine Bush (Del Norte County, Cal., A. W. C., 1870). On the highest sand hill in this vicinity, about half way between the beach and the fir forest, with a marsh on the east, and several ponds, during the rainy season, on the west. The east side of the knoll is covered with pine bush. The station is marked according to note 15.[1]

Pond (Del Norte County, Cal., A. W. C., 1870). On a small hill partially covered with scrubby fir bushes. Behind the hill is a pond whose surface is covered with lilies. The station is marked according to note 15.[1]

Stick (Del Norte County, Cal., A. W. C., 1870). On the line of sand dunes just above the high-water mark. The station is marked according to note 15.[1]

Hut (Del Norte County, Cal., A. W. C., 1870). On the first ridge of sand dunes east of the high-water mark, with a few Indian huts to the west, and a pond of fresh water, during the rainy season, on the east. The station is marked according to note 15.[1]

Round (Del Norte County, Cal., A. W. C., 1870). The station is on a small round sand dune and is marked according to note 15.[1]

Skull (Del Norte County, Cal., A. W. C., 1870). On a large sand dune, where several skulls were found, it having been an Indian burying ground. The station is marked according to note 15.[1]

Forest Mound (Del Norte County, Cal., A. W. C., 1870). On a high sand mound which forks into two long ridges on the west, near the edge of the forest, with a low marsh skirting the hill on the north. The station is marked according to note 15.[1]

Pine (Del Norte County, Cal., A. W. C., 1870). The station is on the inner line of sand dunes, near the forest. It is marked according to note 15.[1]

Flag (Del Norte County, Cal., A. W. C., 1870). On the first prominent sand knoll back of the beach about 100 meters from the high-water mark. The station is marked according to note 15.[1]

Firknoll (Del Norte County, Cal., A. W. C., 1870). On a sand dune 40 feet high and 310 meters distant from the beach, near the edge of the forest, with dwarf firs surrounding it on three sides, leaving it open to the sea. The station is marked according to note 15.[1]

Drift (Del Norte County, Cal., A. W. C., 1870). On the first ridge of a sand dune about 70 meters from the high-water mark. The station is marked according to note 15.[1]

Knob (Del Norte County, Cal., A. W. C., 1870). On a long sand ridge sparsely covered with grass, sloping to the east, to the edge of the fir forest, distant about 10 meters. The station is marked according to note 15.[1]

Sand (Del Norte County, Cal., A. W. C., 1869). On the highest of the sand dunes near the point where the forest comes down to the shore of Pelican Bay, beyond which the shore line becomes low, and confused sand dunes appear. The following magnetic azimuths are given: Westernmost rock of reef, 98°; highest point Star Rock, 42°; center of the top of Rock St. George, 13°. The only station mark mentioned is a stub with five copper tacks in the top, 1½ feet southeast of the station.

St. George (Del Norte County, Cal., A. W. C., 1869). On the summit of the highest rock of Point St. George, which is connected with the main shore by a narrow neck of land. The seaward face of the rock shows white. The station is marked by a bottle buried neck down 3 feet below the surface, and at the surface by a stone block with a hole drilled in the center and filled with lead. There are three stubs around the station, with five copper tacks in the top of each, distant 1.83 meters, bearing north, south, and east, respectively.

St. George north base (Del Norte County, Cal., A. W. C., 1869). On the ridge of a chain of sand hills running nearly parallel and about 70 meters east of a fence, extending in a southerly direction. The following bearings are given: Castle Peak Rock, highest point, S. 12° E. (magnetic); Point Rock, highest point, south (magnetic); St. George Rock, highest point, S. 32° W. (magnetic); and five copper tacks in a blazed fence post, distant 86.3 meters, N. 70° E. (magnetic).

[1] See pp. 81 and 82.

The station is marked by a bottle buried neck down 3 feet below the surface, and at the surface by a hole drilled in a block of blue sandstone and filled with lead. There are three stubs around the station, one each north, south, and east, distant 1.83 meters. In the top of each there are five copper tacks.

Woodedge (Del Norte County, Cal., A. W. C., 1869). On a mound close to the forest line. The following magnetic azimuths are given: Top of St. George Rock, 28°; westernmost rock of reef, 95°; five copper tacks in a tree, distant 13.59 meters, 235°. The station is marked by a bottle buried neck down 3 feet below the surface.

Mound (Del Norte County, Cal., A. W. C., 1869). On the northwestern part of the last one of a series of mounds in an easterly direction from Rock St. George. The station is marked by a bottle buried neck down 3 feet below the surface. There are three stubs, with five copper tacks in the top of each, distant 1.83 meters, and bearing, respectively, north, south, and east. The following magnetic azimuths are given: Connection Rock, 337°; top of Castle Peak Rock, 4°; Point Rock, 29° 40′; center of top of Rock St. George, 72°.

Shell (Del Norte County, Cal., A. W. C., 1869). Located on the northeast bluff of Point St. George. The ground in the vicinity is covered with shells and loose stones. The center of the top of St. George Rock bears S. 7° E. (magnetic), and the highest point of Star Rock bears S. 53° W. (magnetic). The station is marked by a bottle buried neck down 3 feet below the surface. There are three stubs, with five copper tacks in the top of each, distant 1.83 meters and bearing, respectively, north, south, and east.

St. George south base (Del Norte County, Cal., A. W. C., 1869). On the plateau north of Castle Peak Rock, and 150 meters inshore. Five copper tacks in a blazed tree, distant 91.1 meters, bear S. 48° E. (magnetic). The highest point of Castle Peak Rock bears S. 17° E. (magnetic); Point Rock highest point bears S. 11° W. (magnetic); and St. George Rock highest point bears N. 87° W. (magnetic). The station is marked by a bottle buried neck down 3 feet below the surface, and at the surface by a block of blue sandstone with a hole drilled in the center and filled with lead. There are three stubs around the station, one each north, south, and east, distant 1.83 meters. In the top of each there are five copper tacks.

Castle Rock (Del Norte County, Cal., A. W. C., 1869). On the right hand knob, looking south, of the highest peak of the large rock known as Castle Island or Castle Rock. At a little distance the peak resembles the horn of a rhinoceros and can not be mistaken. The only mark is the hole which was drilled for the foot of the signal.

Connection Rock (Del Norte County, Cal., A. W. C., 1869). Near the center of the large rock lying off Preston Point and showing white from the shore. A hole drilled to receive the foot of the signal and a cairn of rock piled up around it are the only marks.

Preston 2 (Del Norte County, Cal., A. W. C., 1869). On Preston Island. No permanent mark.

Wynell (Del Norte County, Cal., A. W. C., 1869). A few feet east of the road leading from Crescent City to White's ranch and in sight of the latter. The station is marked by a bottle buried neck down 3 feet below the surface. The following magnetic azimuths are given: Five copper tacks in a tree distant 29.41 meters, 299° 30′; top of Castle Peak Rock 29°; and Rock Point 75° 30′.

White (Del Norte County, Cal., A. W. C., 1869). On the highest part of the bluff that is inshore from two isolated rocks off Point St. George, which are connected with the mainland at low water only. The station is marked by a bottle buried neck down 3 feet below the surface. There are four stubs with five copper tacks in the top of each, distant 1.83 meters, and bearing, respectively, north, south, east, and west.

Point (Del Norte County, Cal., A. W. C., 1869). On the first of the two rocks lying off Point St. George, which are connected at low water with the mainland. The station is marked by a bottle buried neck down 3 feet below the surface. Three stubs bearing, respectively, north, south, and east, with five copper tacks in the top of each, are distant 1.83 meters.

Crescent City Azimuth (Del Norte County, Cal., A. W. C., 1870). On a bluff bank about 3 meters from the edge. The station is marked by a bottle buried 3 feet below the surface and at the surface by a stone block 4 inches square, with 1½-inch hole drilled 2 inches deep and filled with lead. A copper tack is driven in the lead and the letters "U. S. C. S." are carved in the stone. Three very heavy posts were set around the stone and a fence built to protect it from the cattle.

Battery Point 2 (Del Norte County, Cal., A. W. C., 1869). Lost 1871.

Steamboat Rock (Del Norte County, Cal., J. S. L., 1859; 1869). On the highest part of Steamboat Rock, about 7.5 meters from the northern edge of the top of the rock, about 15 meters from the southern edge, and 12 meters from a small but very noticeable prominence on a large detached piece of rock on the south end of the ridge. The station is marked by a one-half inch hole drilled 1½ inches in solid rock.

Whalers Island (Del Norte County, Cal., J. S. L., 1859; 1869). On the second, counting from the northward of the four prominent knobs on Whalers Island, on a flat spot 1½ feet square, having three small projections rising around it, forming sort of a basin, near the center of which is the station. The station is marked by a drill hole one-half inch in diameter and 1 inch deep.

Smyth 2 (Del Norte County, Cal., G. D., 1871). On a long, low, gradually rounding point about a mile east of Elk Creek. The station is marked by a bottle buried 2½ feet below the surface, and at the surface is a stone 8 by 6 by 4 inches, with a one-half inch hole drilled in it.

Ehroser 2 (Del Norte County, Cal., A. W. C., 1871). On a narrow ridge of sand extending along the beach just above the high-water mark. The station is marked according to note 15.[1]

[1] See pp. 81 and 82.

Round Rock (Del Norte County, Cal., J. S. L., 1859; 1869). On the top of Round Rock, which is about 20 feet in diameter and nearly level, with some three or four slight elevations or mounds. The station is on the northeast one of these mounds and is marked by a one-half inch drill hole in the rock 1½ inches deep.

Alexander (Del Norte County, Cal., A. W. C., 1871). On the bank just behind the driftwood southeast of Alexander's stable, and immediately outside the fence, 18 meters from the southeast corner of the stable, and 0.89 meter from the fence. The station is marked according to note 15.[1]

Crescent City northeast base (Del Norte County, Cal., J. S. L., 1859; 1869). Lost.

Smyth (Del Norte County, Cal., J. S. L., 1859). Lost.

Crescent City southwest base (Del Norte County, Cal., J. S. L., 1859; 1869). Lost.

Astronomical (Del Norte County, Cal., ——, 1853). Lost.

Battery (Del Norte County, Cal., J. S. L., 1859). Lost 1869.

Preston (Del Norte County, Cal., J. S. L., 1859). Lost.

Sister Rock (Del Norte County, Cal., A. W. C., 1871). On the highest peak, 108 feet above sea level, of the largest of the three rocks lying offshore below Crescent City and known as Sister Rocks. The station is marked by a bottle with the neck broken off, placed in a natural crevice in the rock.

Long Point (Del Norte County, Cal., A. W. C., 1871). On a long projecting point, close to the trail and west of it, 765 feet above sea level. The station is marked according to note 15.[1]

White Knob (Del Norte County, Cal., A. W. C., 1871). On the high knob or point that forms the end of the stretch of beach below Crescent City. To reach the station follow the trail up to the first ridge and turn to the right. It will be found on a rock forming the southern point. The station is marked by a hole drilled in the rock and filled with broken glass.

Woody Point (Del Norte County, Cal., A. W. C., 1871). On an open point well down toward the edge of the bluff and west of the trail. The station is marked according to note 15.[1]

Green (Del Norte County, Cal., A. W. C., 1871). On a point making out from near the branching of the trails below Long Point, partly down the hill, on a round hummock on the face of the ridge, 780 feet above sea level. The station is marked according to note 15.[1]

Bush (Del Norte County, Cal., A. W. C., 1871). The station is on a prominent point, and it is marked according to note 15.[1]

Point (Del Norte County, Cal., A. W. C., 1871). On a long projecting point easily distinguished by several large rocks on its sea surface. The station is on top of one of these rocks where the surface was covered with a thick growth of small bushes. It is necessary to use ladders to reach the top of the rock. The station is marked according to note 15.[1]

Grant (Del Norte County, Cal., A. W. C., 1871). West of the trail on the only clear point, on the bluff edge, in the vicinity, 740 feet above the sea level. The station is marked according to note 15.[1]

Low (Del Norte County, Cal., A. W. C., 1871). On a great slide of earth which is now solid. The station is marked according to note 15.[1]

Near (Del Norte County, Cal., A. W. C., 1871). On a projecting point close to the trail. The station is marked according to note 15.[1]

Wilson (Del Norte County, Cal., A. W. C., 1871). On a high pine-backed hill on the left side of the trail going toward the Klamath River, behind a number of rocks on the sidehill. The station is marked according to note 15.[1]

Last (Del Norte County, Cal., A. W. C., 1871). On a marked bluff or point making out beyond Wilson Creek or False Klamath, and about halfway between the creek and the long point off which lay the island rocks, about 180 feet above the sea level. The station is marked according to note 15.[1]

Rock (Del Norte County, Cal., A. W. C., 1872). On the highest point of a small rock, not over 18 or 20 feet in height, below the False Klamath, and about 1½ miles offshore. The station was in a natural crevice in the rock and the stones piled around the signal serve as the only station mark.

Halfway (Del Norte County, Cal., A. W. C., 1872). On the summit of a hill about halfway between the False Klamath and the Klamath River. The station is marked according to note 15.[1]

Pine Ridge (Del Norte County, Cal., A. W. C., 1872). On the summit of a high hill crowned with a few small pine trees, with the trail passing on the upper side and only a few feet distant. The station is marked according to note 15.[1]

Council Mound (Del Norte County, Cal., A. W. C., 1872; 1873). On a rounded hill or knoll forming the culmination of the long ridge on the north side of the Klamath River, on the left side of the trail going south and distant about 300 meters. The station is marked according to note 15.[1]

Flint Rock (Del Norte County, Cal., A. W. C., 1872; 1873). Lost.

Council Point (Del Norte County, Cal., A. W. C., 1872). On a prominent point of the long ridge on the north side of the Klamath River, about 300 feet above the beach, in front of quite a prominent clump of rocks, with the trail passing above it distant about 300 meters. The station is marked according to note 15.[1]

Klamath South (Del Norte County, Cal., A. W. C., 1872; 1873). Lost. The station was marked according to note 15.[1]

Redding Rock (Humboldt County, Cal., A. W. C., 1874). Redding Rock is a single isolated peak of quartz, 5 miles offshore from Gold Bluffs. (See fig. 9.) The station is on the highest point of the rock, 94 feet above high water. The station is marked by a square hole drilled in the rock at the bottom of which is a round hole in which an iron pin 1½ inches in diameter is set. Around the station are some iron pintles set in the rock at requisite distances to which the guy ropes were attached.

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[1] See pp. 81 and 82.

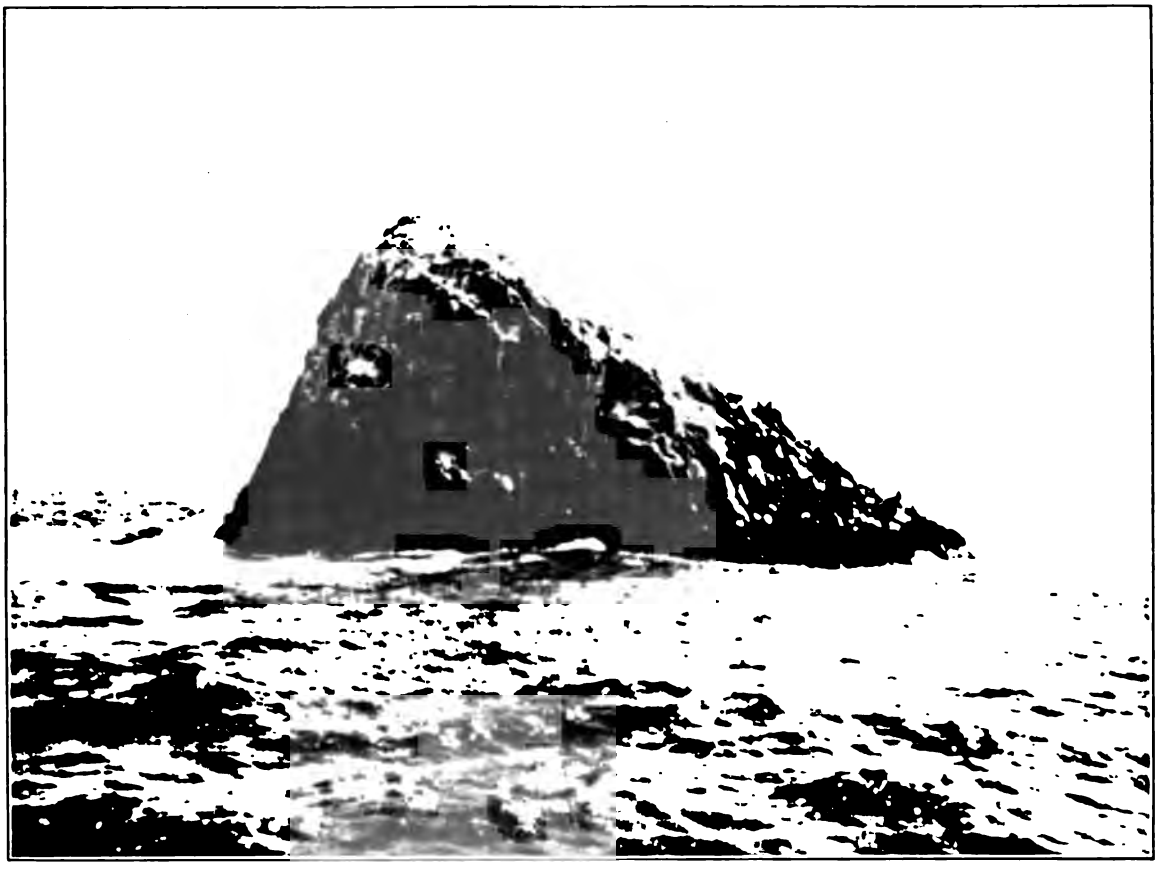


FIG. 9.—REDDING ROCK, CALIFORNIA, ONE OF THE MANY ROCKS OFF THE COASTS OF CALIFORNIA AND OREGON.

Split Rock (Humboldt County, Cal., A. W. C., 1874). On a remarkable promontory or projection of the coast line, on the right of the trail going south from the mouth of the Klamath River. The station is marked according to note 15.[1]

Alder Butte (Humboldt County, Cal., A. W. C., 1874). On a prominent butte south of Split Rock, on the left of the trail going south. Below the station there is a grove of alders. The station is marked according to note 15.[1]

Johnson (Humboldt County, Cal., A. W. C., 1874). Following the trail south from the ranch of Mr. Johnson, up the hill and through the timber until a bare ridge is finally reached. From here the trail leads down to the Ossegan Indian village and creek of the same name. As the trail begins to descend turn sharply to the right and the station will be found on a commanding point overlooking the sea, about 400 meters from the trail. The station is marked according to note 15,[1] except there is a stone above the bottle with a drill hole in it.

Upper Bluff (Humboldt County, Cal., A. W. C., 1874). On the bench or slide from the main bluff near the works of the Upper Gold Bluff Mining Co., and 10 meters north of an old rotten stump. The Upper Gold Bluffs are one continuous line of vertical cliffs south from Ossegan Creek, and the station is just north of the point where the first break in this line occurs. The station is marked by a bottle buried 3 feet below the surface, and at the surface by a drill hole in a square stone block, and by four stubs with copper tacks in the top of each and bearing north, south, east, and west (magnetic).

Mussel Point (Humboldt County, Cal., A. W. C., 1874). About 1½ or 2 miles beyond the Lower Gold Bluff mine and dwelling houses, on a bold promontory which is the first marked point projecting beyond the beach below the bluffs. The station is marked by a bottle buried 3 feet below the surface, and at the surface by a drill hole in a square stone, surrounded by four stubs with copper tacks in the tops bearing north, south, east, and west (magnetic).

Sharp Point (Humboldt County, Cal., A. W. C., 1874). On an exceedingly prominent knoll or promontory standing out from the mainland about 1 mile south of the spot where the stone lagoon approaches the beach. The station is on the sharp apex of the peak forming the end of the point, on a spot leveled off to afford room for the signal. A rock left standing was dressed off square and a drill hole in this rock marks the station.

Big Lagoon (Humboldt County, Cal., A. F. R., 1870; 1874). Nine miles north of Trinidad by the coast trail, on the northern end of the bluff north of Rock Point, about 300 meters south of the point where the coast trail leaves the bluff and leads on to the Big Tyoon beach, about 60 feet above the tide. The station is marked by a stub 3 feet long with the top level with the surface surrounded by four witness marks with tacks in the top of each, distant 1.83 meters, bearing north, south, east, and west.

Patricks Pinnacle (Humboldt County, Cal., A. F. R., 1870; 1874). On the point known as Rocky Point about 8 miles north of Trinidad by the coast trail, on a pinnacle of rocks piled up in a huge mass of fragments. The station is marked by a stub 2 feet long with rocks piled up around it.

Inner Turtle Rock (Humboldt County, Cal., A. F. R., 1870). On the highest point of the smaller of the two Turtle Rocks, the last off-lying rocks north of Trinidad. There is no permanent station mark.

Patricks Point South (Humboldt County, Cal., A. F. R., 1870). About 7 miles north of Trinidad by the coast trail. The station is marked by a nail in the top of a stub 3 feet long, set level with the surface.

Castle (Humboldt County, Cal., A. F. R., 1870). On the prominent rock called Castle Rock, overlooking the Forty Nine trail and within shooting distance thereto. The station is the lowest point in the hole in the rock, said to have been used as a rifle pit by a former settler named Patrick.

Bight Tree (Humboldt County, Cal., A. W. C., 1870). The station is a tree marked by girdling about 1 foot wide and 3 feet above the ground, in the deepest part of the indentation between Trinidad Head and Big Lagoon, on the top of the bluff about 200 feet above the tide.

COMPUTATION, ADJUSTMENT, AND ACCURACY OF THE ELEVATIONS.

The zenith distances directly observed at each station were first computed. These zenith distances were corrected for height of the object observed and of instrument so as to refer them all to the ground at each station or to the station marks.

The difference of elevation of each pair of stations in the main scheme was then computed from the observations over the line joining them by the formula

$$h_2 - h_1 = s \tan \tfrac{1}{2} (\zeta_2 - \zeta_1) \left[1 + \frac{h_2 + h_1}{2\rho} + \frac{s^2}{12\rho^2} \right]$$

in which h_2 and h_1 are elevations of the stations, ζ_2 and ζ_1 are the measured zenith distances as corrected for height of instrument and of object observed, s is the horizontal distance between the stations, and ρ is the radius of curvature.

As there are always two or more lines to each new station, many rigid conditions exist between the observed difference of elevation, even if the connections with the precise leveling were ignored, and the least square adjustment furnishes the readiest accurate means of deriving the required elevations.

[1] See pp. 81 and 82.

The elevations given in the following tables were adjusted in several sections. The weight p assigned to each difference of elevation was computed by the formula $\log p = 9 - 2 \log s$. The length of line corresponding to unit weight is 31.7 kilometers, or 19⅞ miles. Hence there is an equal chance whether the elevation over a line of this length is in error by an amount greater or less than the probable error of unit weight.

The following table gives the probable error of unit weight of the several sections. The elevations in the "Vicinity of Portland" are from Special Publication No. 13, "The California-Washington Arc of Primary Triangulation," and are a part of the adjusted elevations between the Willamette base net and Tacoma base. The probable error of unit weight given here is derived from this whole section.

Section.	Probable error of unit weight.
	Meters.
Umpqua River to Tillamook Bay	±1.18
Coos Bay and San Sebastian	±1.19
Rogue River to Klamath River	±1.98
Mouth of Columbia River	±1.58
Vicinity of Portland	±0.78

ELEVATIONS.

The datum for all elevations is mean sea level.

The elevations are divided into three classes: First, those fixed directly by spirit leveling or by tidal bench marks which are subject to very small errors; second, the stations in the main scheme, which are fixed by reciprocal measures of vertical angles; third, the intersection stations, of which the elevations are fixed by the measure of vertical angles which are not reciprocal, since the intersection stations are not occupied, and whose elevations are subject to errors which may be as great as 3 meters.

The accuracy with which the elevation of any station in the main scheme is determined depends mainly upon the remoteness of that station from the nearest one of which the elevation is fixed by spirit leveling. Long Ridge, with a probable error of ±1.17 meters, is probably the least accurately determined of any of the stations in the main scheme between Rogue River and Klamath River.

TABLE OF ELEVATIONS.

Umpqua River to Tillamook Bay.

Station.	Point to which elevation refers.	Elevation.		Station.	Point to which elevation refers.	Elevation.	
		Meters.	Feet.			Meters.	Feet.
Class 1.				*Class 2*—Continued.			
Bench	Station mark	1.77	5.81	Cummins	Station mark	755.6	2479.0
Class 2.				Table	do	838.9	2752.3
				Life	do	36.0	118.1
Beach	Station mark	5.5	18.0	Iron	do	198.6	651.6
Wind	do	17.2	56.4	Yaquina Lighthouse	Center of ball	51.9	170.3
Cab	do	5.0	16.4	Bald	Station mark	849.7	2787.7
Sand Hill 2	do	32.6	107.0	Foulweather	do	315.0	1033.5
Umpqua River Lighthouse	Center of ball	53.0	173.9	Cascade	do	477.1	1565.3
Brushy Hill 2	Station mark	74.5	244.4	Salmon	do	180.9	593.5
Burn	do	134.1	440.0	Hebo	do	961.0	3152.9
Dean	do	479.0	1571.5	Buzzard Butte	do	513.8	1685.7
Trail	do	268.4	880.6	Round Top	do	364.3	1195.2
Maple	do	343.8	1127.9	Flat	do	303.5	995.7
Cape	do	431.7	1416.3	Fletcher	do	64.3	211.0
Sugar Loaf 2	do	35.3	115.8	Bozley	do	157.3	516.1
Cannery Hill	do	43.3	142.1	Sheep Hill	do	119.4	391.7
Green	do	140.7	461.6	Gage B	do	151.8	498.0
Spur	do	200.2	656.8	Ginger	do	468.4	1536.7
Snag	do	442.4	1451.4	Shell Point	do	2.6	8.5
Loaf	do	52.4	171.9				
Heceta	do	160.6	526.9	*Class 3.*			
Heceta Head Lighthouse	Center of ball	67.9	222.8				
Turn	Station mark	104.1	341.5	Doty	Top of peak	438.3	1438.0
Head	do	84.0	275.6	Boulder Point	Station mark	0.8	2.6
Fairview	do	703.0	2306.4	Euchre Mountain	Top of trees	786.3	2579.7
Plateau	do	437.1	1434.0	Cape Lookout Summit	do	605.8	1987.5
Tree	do	115.6	379.3	Green Hill 2	Station mark	126.8	416.0

Coos Bay and San Sebastian.

Station.	Point to which elevation refers.	Elevation.		Station.	Point to which elevation refers.	Elevation.	
		Meters.	Feet.			Meters.	Feet.
Class 1.				*Class 2.*—Continued.			
U. S. G. S. bench mark Marshfield.	Bronze tablet marked 11.	3.28	10.778	Stack	Station mark	1062.7	3486.5
Class 2.				Craggy	do	1368.3	4489.2
				Bosley	do	1037.4	3403.5
				Grizzley	do	705.4	2314.3
Camas	Station mark	995.6	3266.4	Sundown 2	do	648.0	2126.0
Bolivar	do	1309.8	4297.2	Dolan	do	216.1	709.0
Johnson	do	890.8	2922.6	Red Rock	do	394.6	1294.6
Bennett	do	661.5	2170.3	*Class 3.*			
Sugar	do	453.8	1488.8				
Westport	do	216.8	711.3	Butler	Station mark	891.4	2924.5
Cathcart	do	557.6	1829.4	Cotton	do	566.4	1858.3
Marshfield Hill	do	70.6	231.6	Salmon Mountain	Top of peak	962.4	3157.5
Noah	do	279.6	917.3	Port Orford astronomic 2	Station mark	74.1	243.1
White Point 3	do	8.6	28.2	Arch Rock	Top of rock	35.0	114.8
Mill	do	51.3	168.3	Colliers Butte	Top of sharp peak	1315.4	4315.6
Porter	do	20.3	66.6	Heads	Station mark	78.2	256.6
Pierce	do	15.9	52.2	Madden	do	242.4	795.3
Edson	do	841.8	2761.8	Rocky Peak	Top of peak	971.3	3186.7
Bill	do	464.0	1522.3	Saddle Mountain	do	1332.9	4373.0
Bald	do	900.5	2954.4	Sixes	Station mark	60.5	198.5
Cape	do	56.0	183.7	Mount Emery or Chetko	Top of peak	829.5	2721.4
Squirrel	do	1611.0	5285.4				

Rogue River to Klamath River, Cal.

Class 1.				*Class 3.*			
Redding Rock		0.00	0.00	Mound	Station mark	244.8	803.1
Class 2.				Klamath South 2	do	144.2	473.1
				Preston Peak South	Top of peak	2206.0	7237.5
				Small Hill southwest of Bosley.	Bushes	625.5	2052.2
Polly wog	Station mark	811.1	2661.1	Bear Mountain	Top of peak	1948.1	6391.4
Elk	do	504.6	1655.5	Second peak north of Preston Peak.	do	2069.9	6791.0
Pack Saddle	do	815.7	2676.2	Four Brothers No. 1	do	1588.7	5212.3
High Divide	do	708.8	2325.4	Four Brothers No. 2	do	1608.7	5277.9
Long Ridge	do	1056.0	3464.6	Four Brothers No. 3	do	1611.2	5286.1
Bald Hill	do	585.2	1919.9	Four Brothers No. 4	do	1602.2	5256.6
Gordon	do	1256.1	4121.1	Preston Peak	do	2217.2	7274.3
Child	do	698.2	2290.7	Peak No. 6	do	1911.3	6270.7
Rattle	do	1100.5	3610.6	Sawtooth north	do	1759.1	5771.3
Red Mountain	do	1287.7	4224.7	Sawtooth south	do	1753.2	5752.0
				Peak No. 8	do	1575.2	5168.0

Mouth of the Columbia River.

Class 2.				*Class 2*—Continued.			
Scarboro Hill 2	Station mark	207.3	680.1	Tillamook Head	Station mark	346.3	1136.1
Saddle Mountain 2	do	995.6	3266.4	Battery	do	81.7	268.0

Vicinity of Portland, Oreg.

Class 1.				*Class 2*—Continued.			
Oregonian	Top of tower	69.22	227.10	Fir	Station mark	345.9	1134.8
Class 2.				Monument, General Land Survey.	do	289.7	950.5
				Warren	do	38.9	127.6
River	Station mark	50.2	164.7	Rocky Butte	do	185.3	607.9
Cem	do	825.8	2709.3				
Hill	do	296.8	973.8				

EXPLANATION OF THE SKETCHES.

On the following sketches there are shown the location of all the points whose positions are given in this publication, except those in the table of lost positions and the reference marks whose positions are computed, so that the names of all the stations in any locality may be secured simply by the inspection of a sketch, and then from the index their positions may readily be found in the table of positions. A line of the main scheme is shown as a full line when observed over in both directions, and is broken at one end when not observed over from the station at that end of the line. The stations that were occupied are shown by a triangle and the unoccupied stations by a circle. The measured bases are indicated by a heavy line. On the first of the sketches is shown the general location in the United States of the areas covered by published triangulation which has been rigidly computed on the North American datum. The second is an index map for the sketches which show the triangulation in detail.

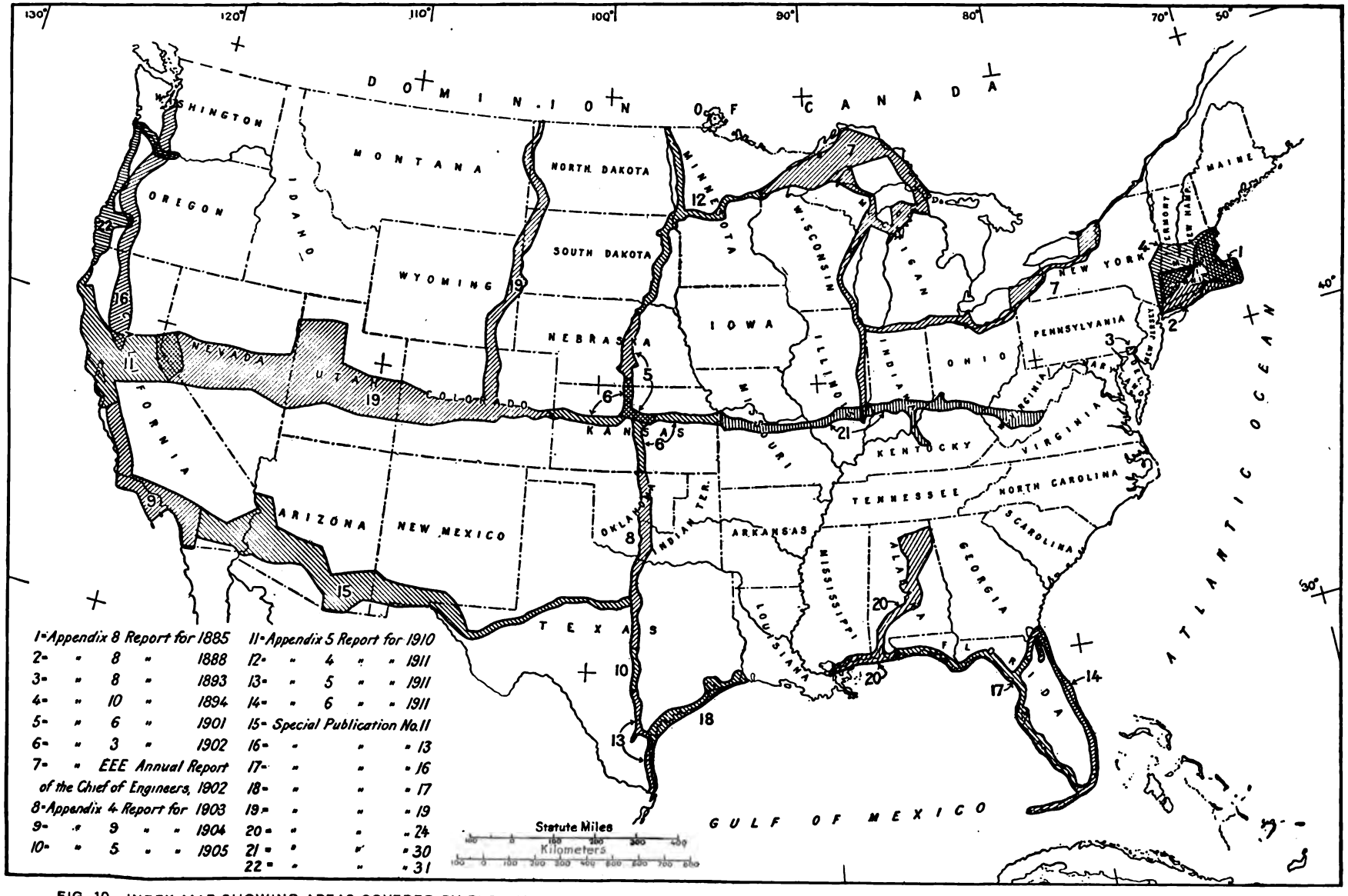
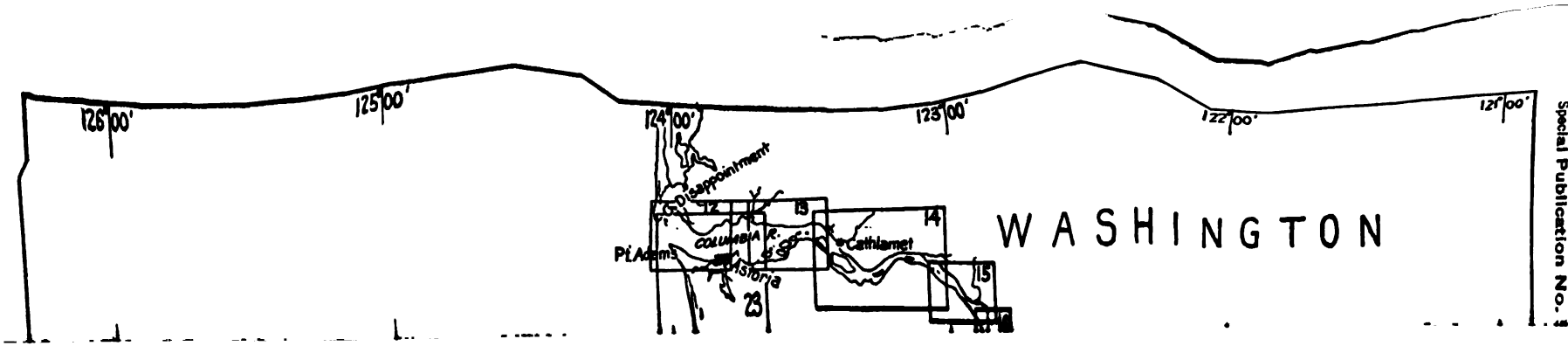


FIG. 10.—INDEX MAP SHOWING AREAS COVERED BY PUBLISHED TRIANGULATION WHICH HAS BEEN RIGIDLY COMPUTED ON THE NORTH AMERICAN DATUM.


126°00'
125°00'
124°00'
123°00'
122°00'
121°00'
Disappointment
12
13
14
15
WASHINGTON
Columbia R.
Pt. Adams
Astoria
Cathlamet
23

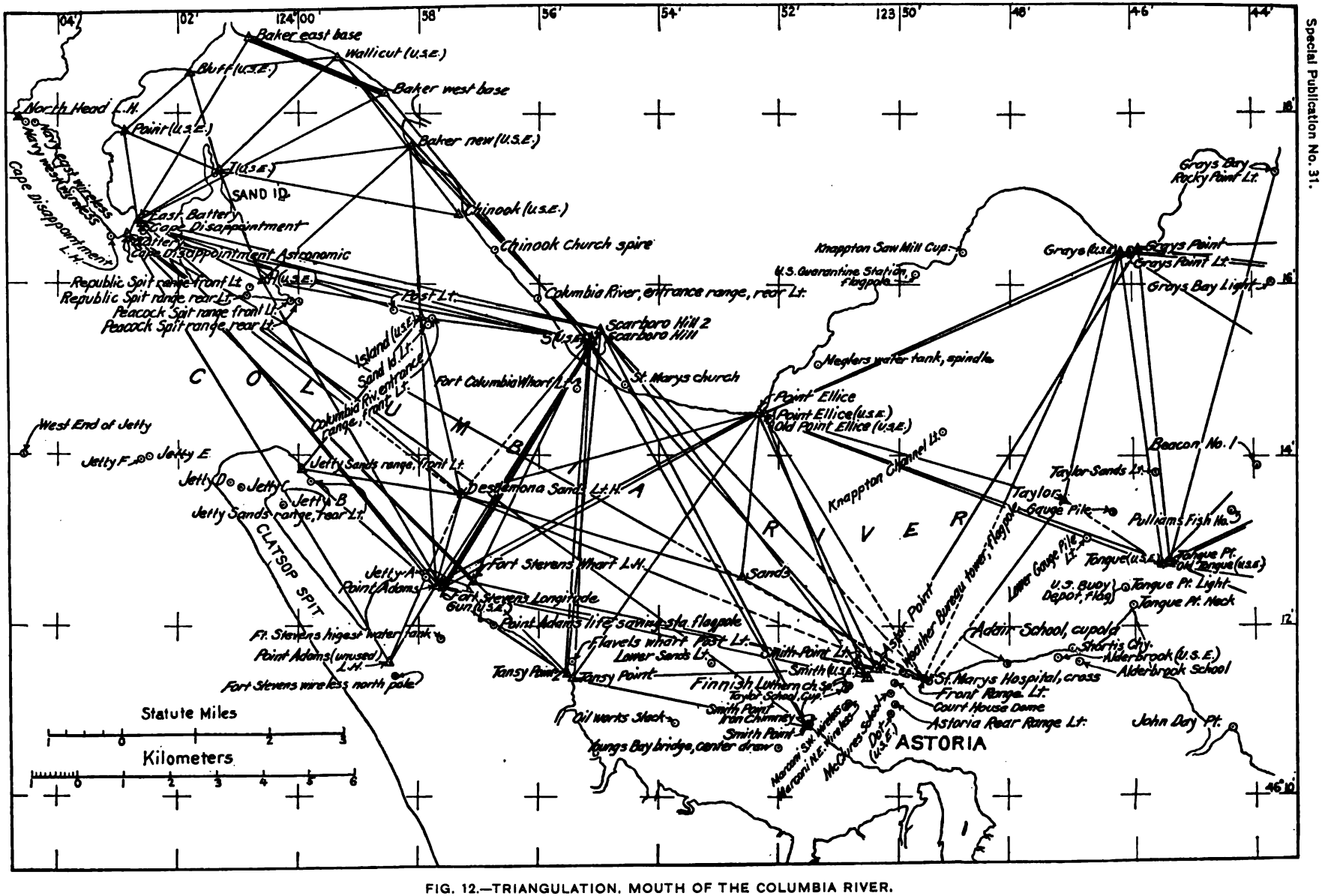


FIG. 12.—TRIANGULATION, MOUTH OF THE COLUMBIA RIVER.

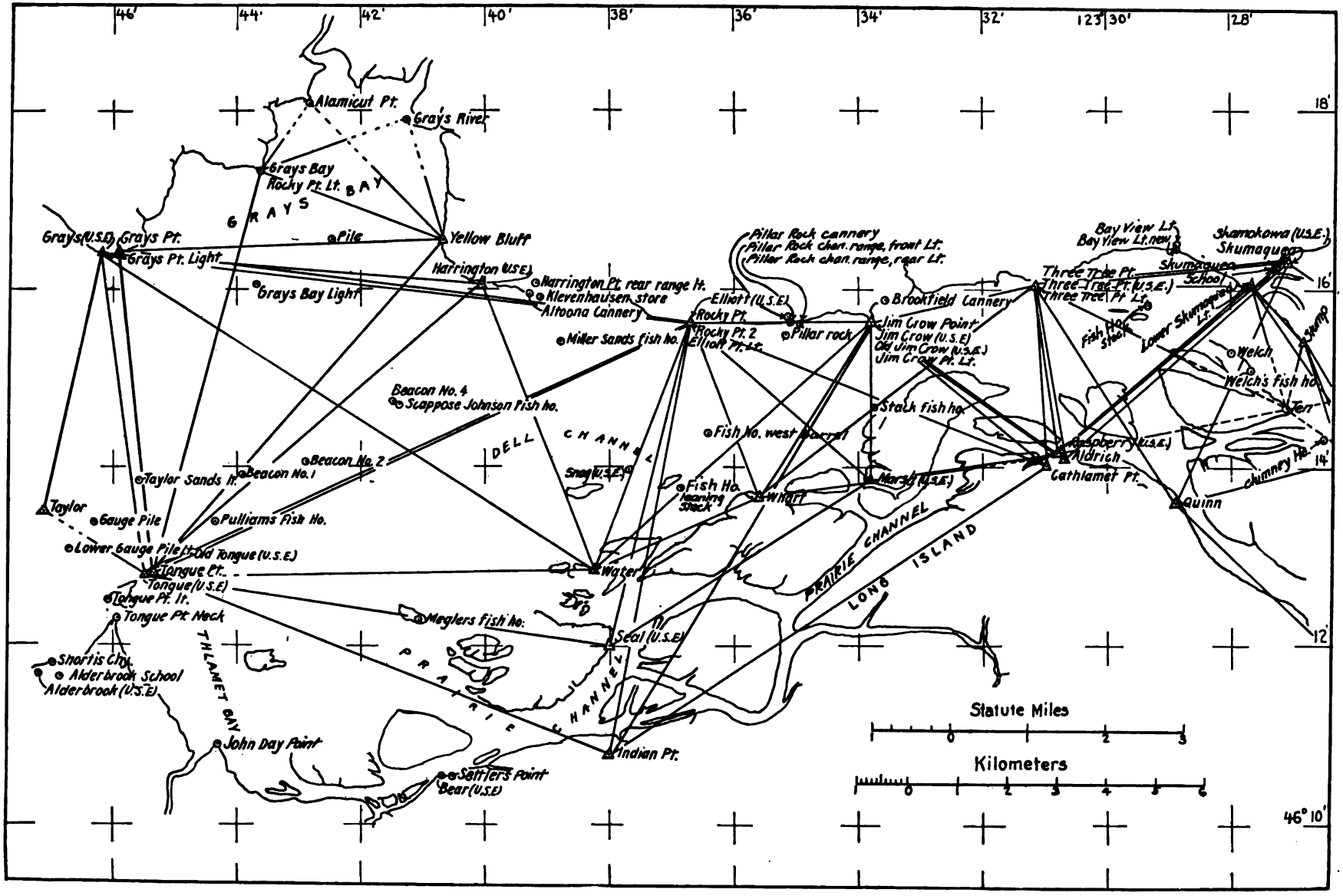


FIG. 13.—TRIANGULATION, COLUMBIA RIVER, GRAYS BAY TO THREE TREE POINT.

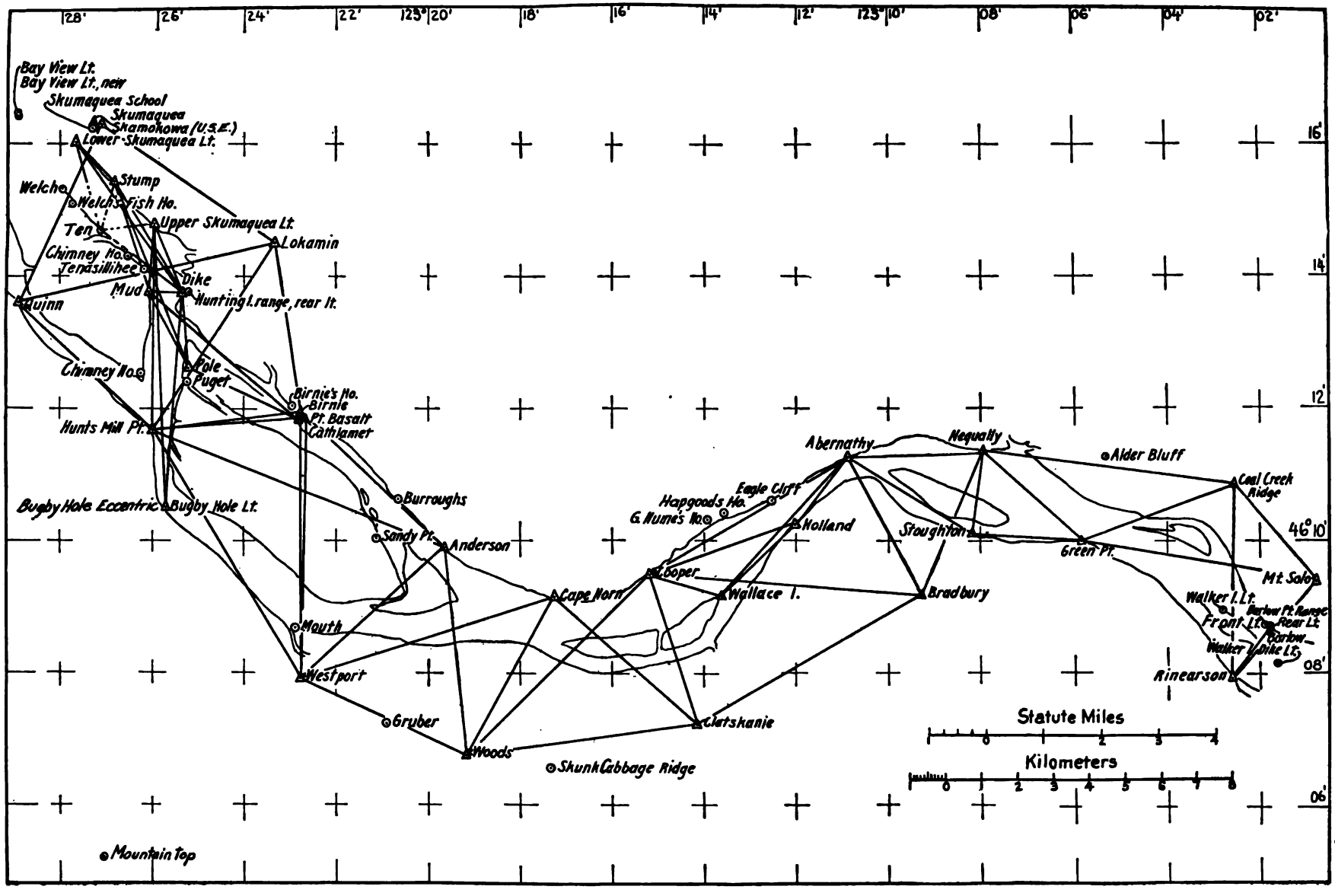


FIG. 14.—TRIANGULATION, COLUMBIA RIVER, SKUMAQUEA TO WALKER ISLAND.

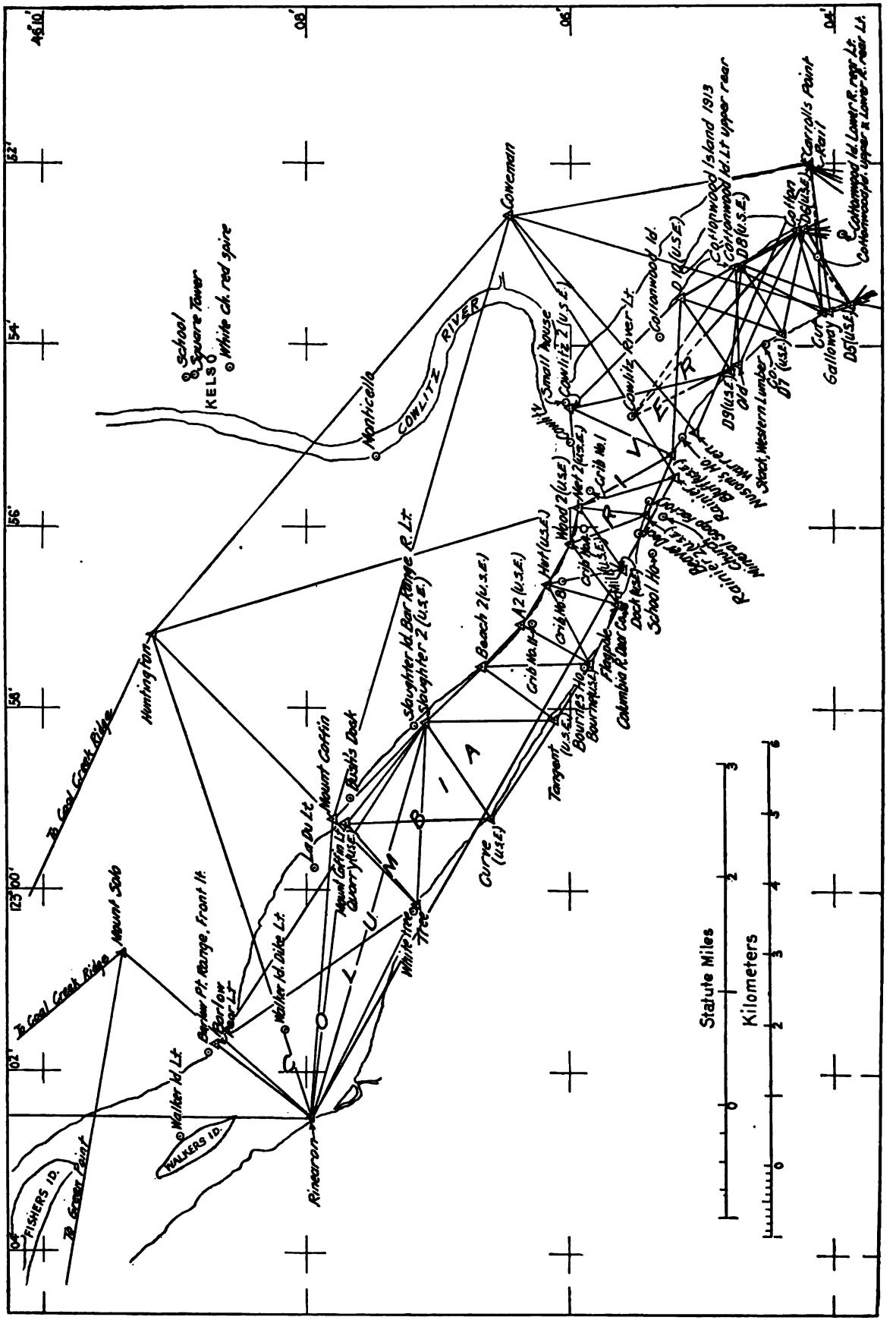


FIG. 15.—TRIANGULATION, COLUMBIA RIVER, WALKER ISLAND TO COTTONWOOD ISLAND.

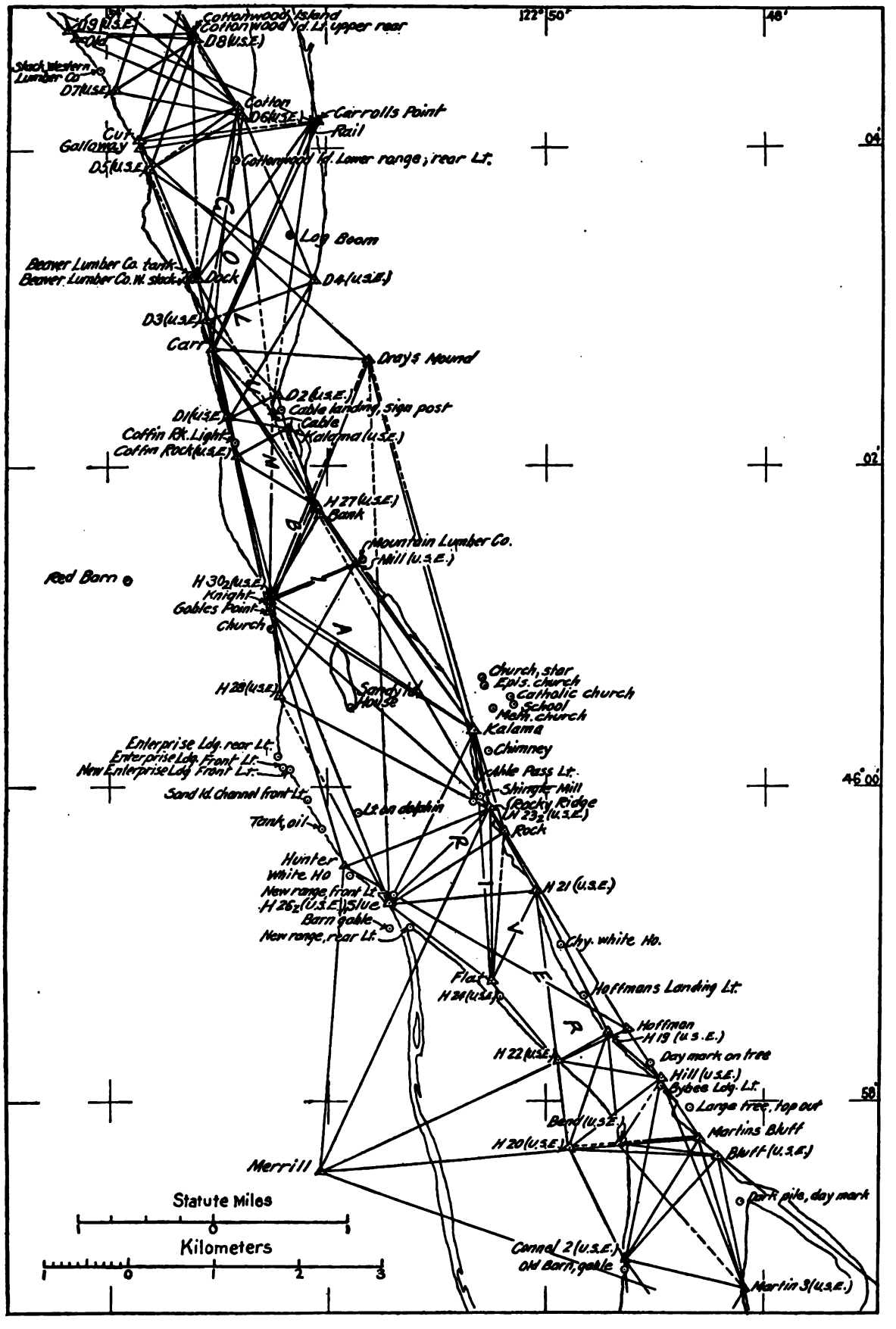


FIG. 16.—TRIANGULATION, COLUMBIA RIVER, COTTONWOOD ISLAND TO MARTIN ISLAND.

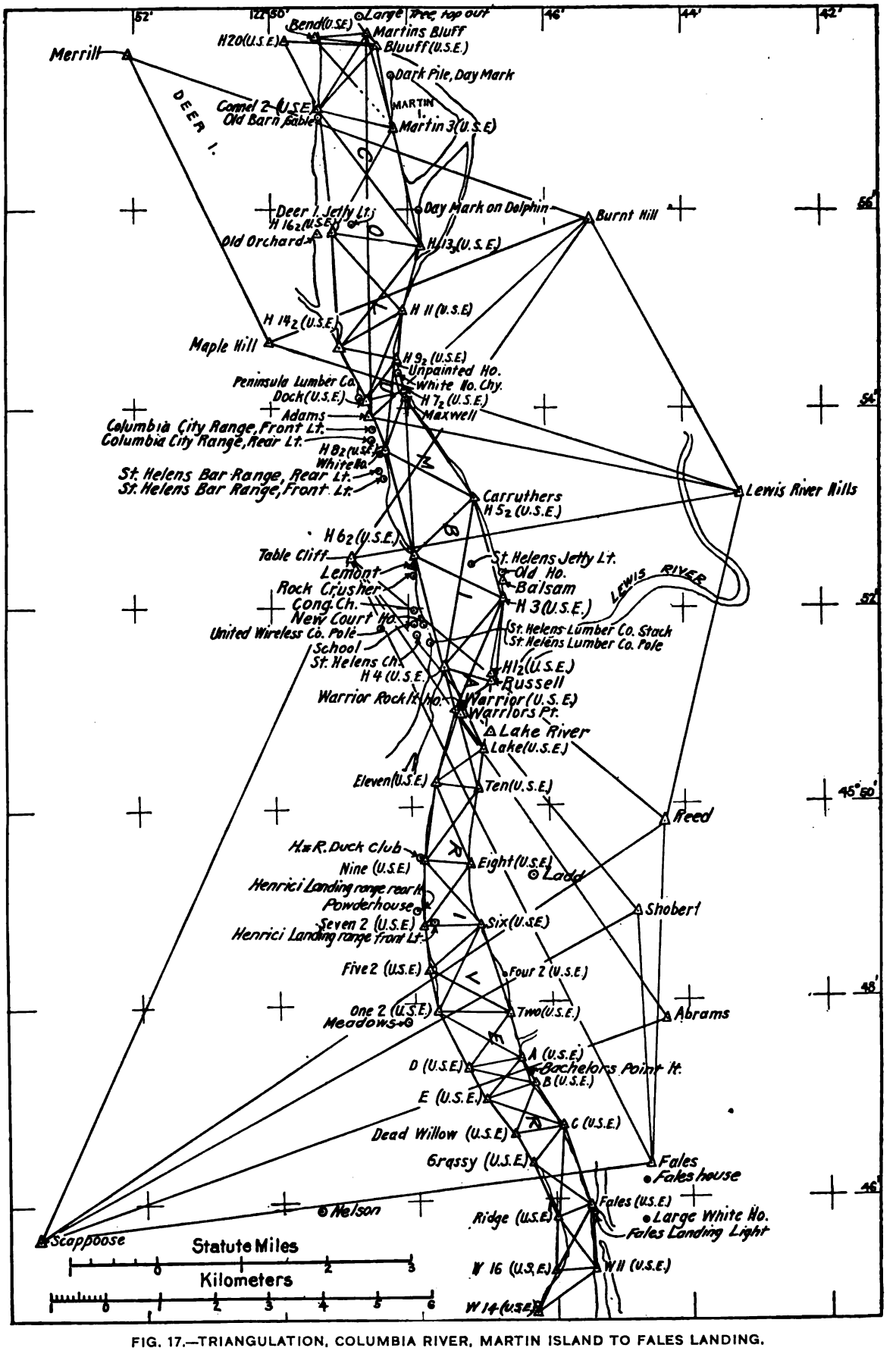


FIG. 17.—TRIANGULATION, COLUMBIA RIVER, MARTIN ISLAND TO FALES LANDING.

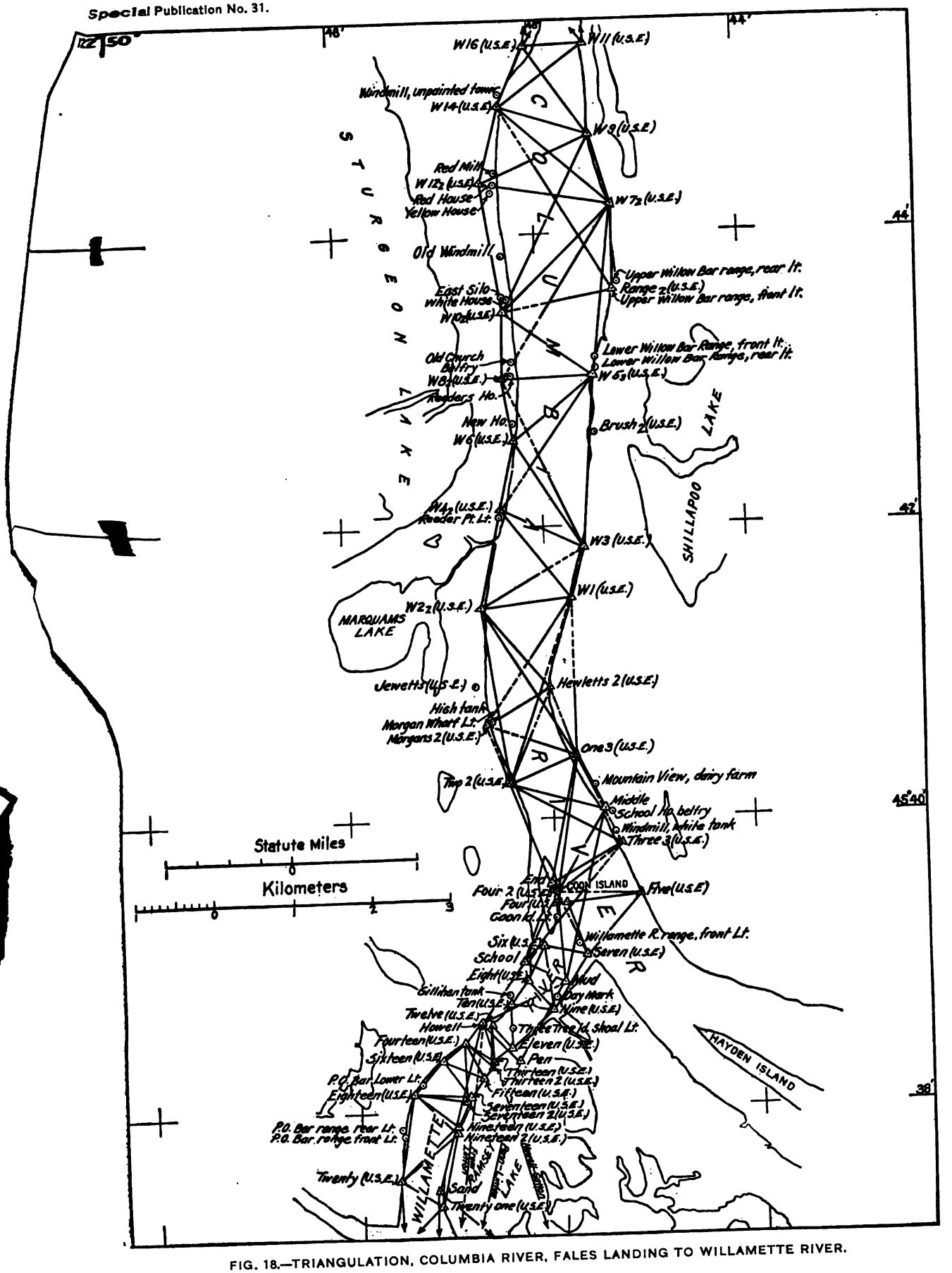


FIG. 18.—TRIANGULATION, COLUMBIA RIVER, FALES LANDING TO WILLAMETTE RIVER.

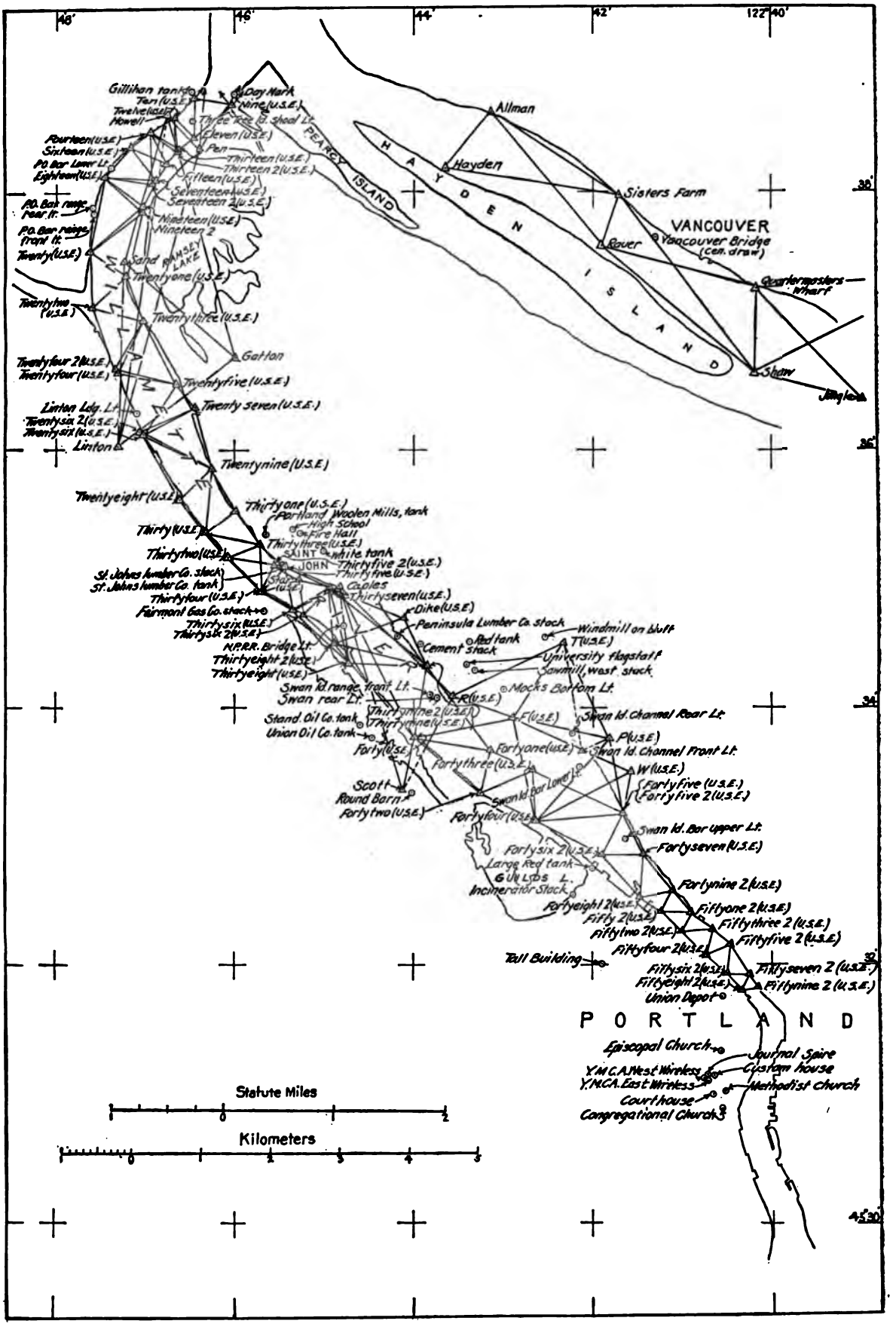


FIG. 19.—TRIANGULATION, MOUTH OF THE WILLAMETTE RIVER TO PORTLAND.

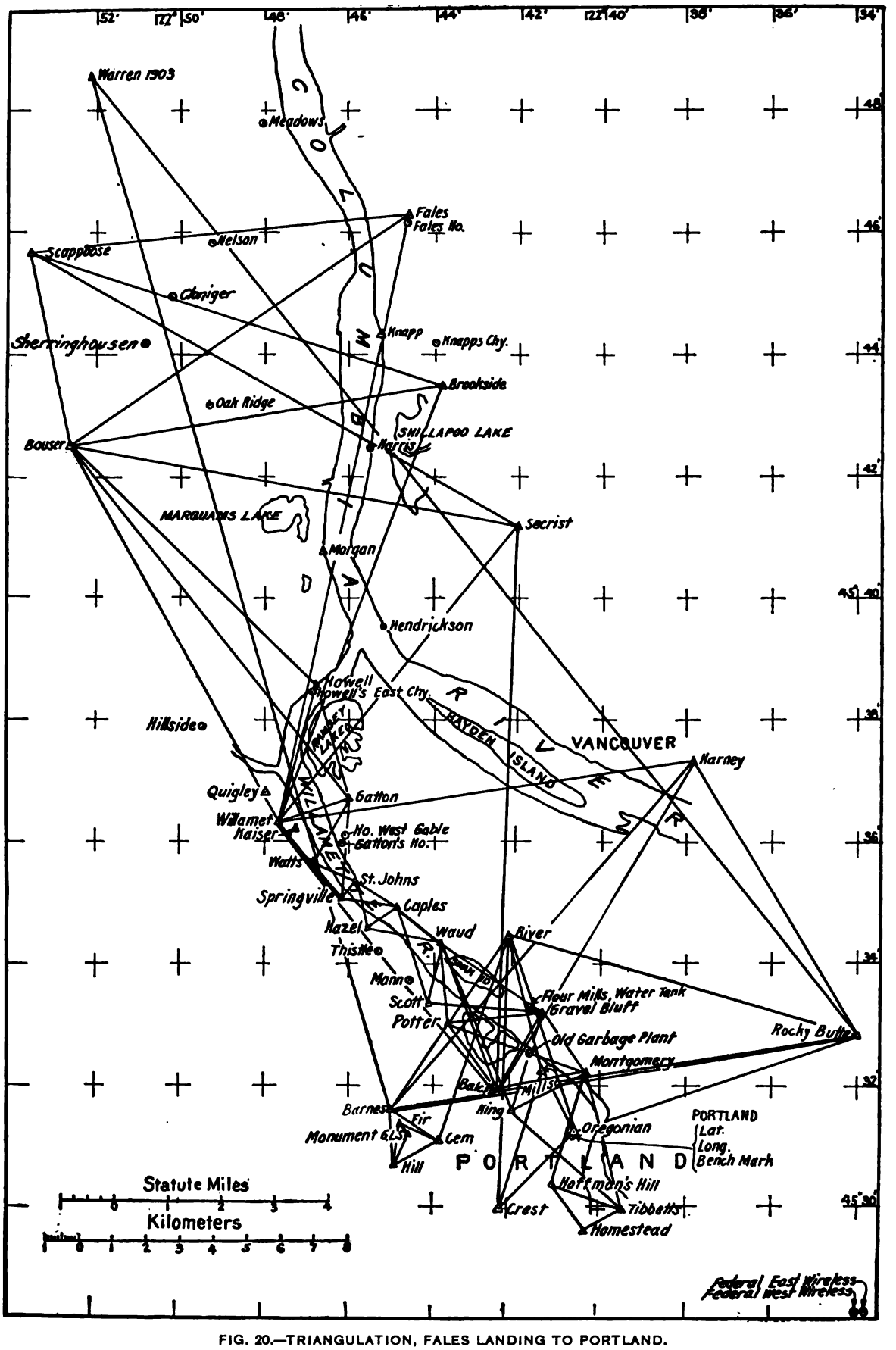


FIG. 20.—TRIANGULATION, FALES LANDING TO PORTLAND.

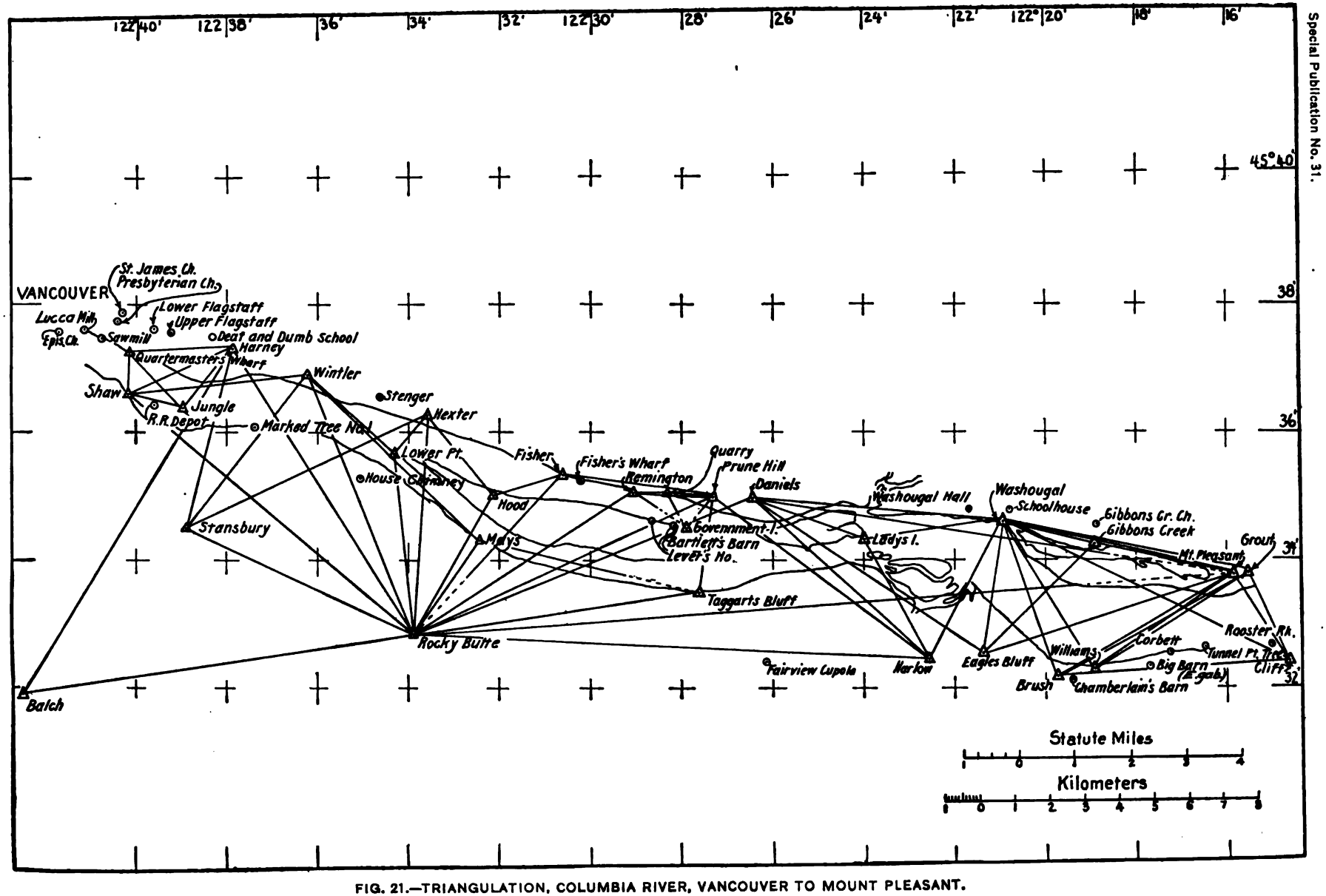


FIG. 21.—TRIANGULATION, COLUMBIA RIVER, VANCOUVER TO MOUNT PLEASANT.

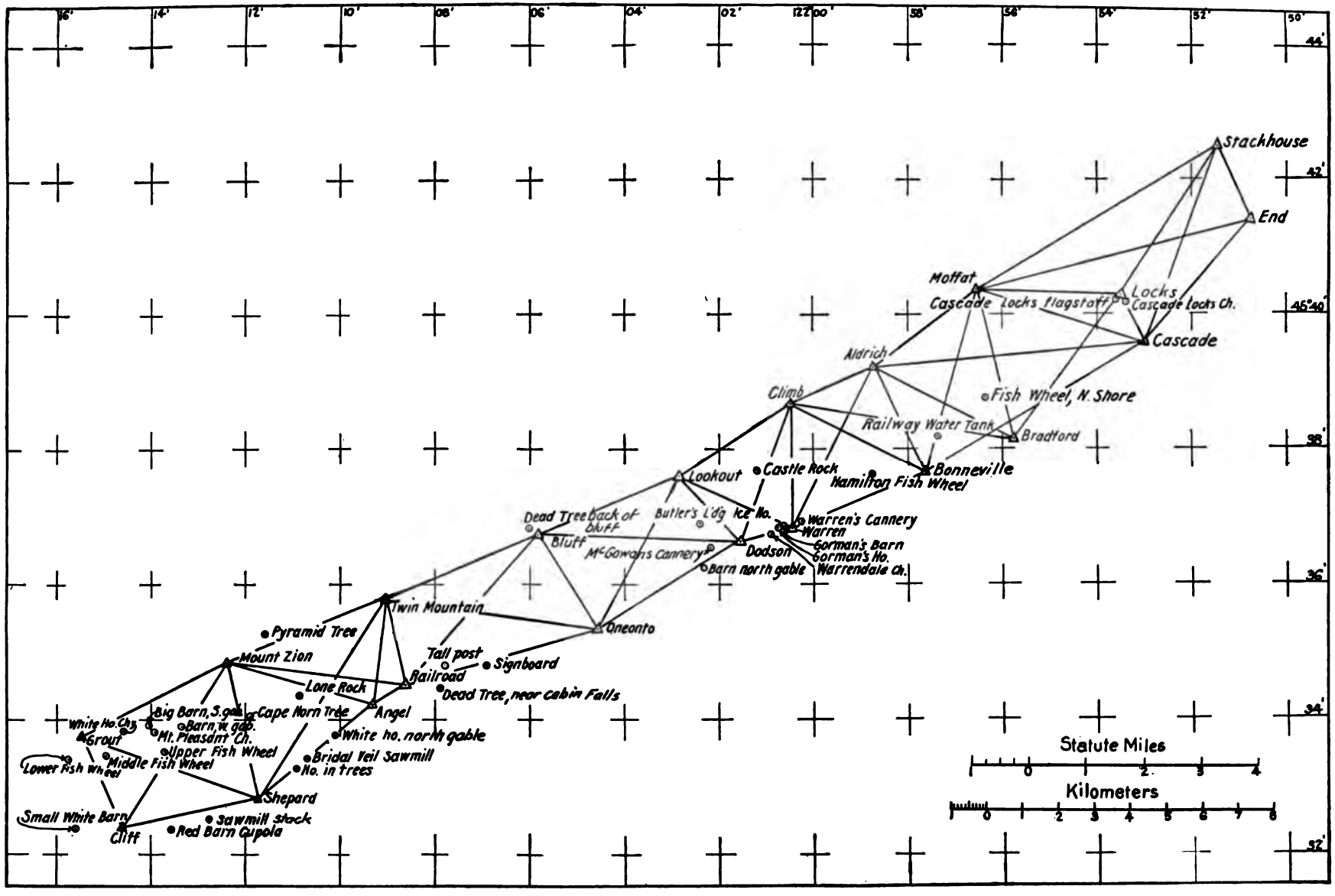


FIG. 22.—TRIANGULATION, COLUMBIA RIVER, MOUNT PLEASANT TO CASCADE LOCKS.

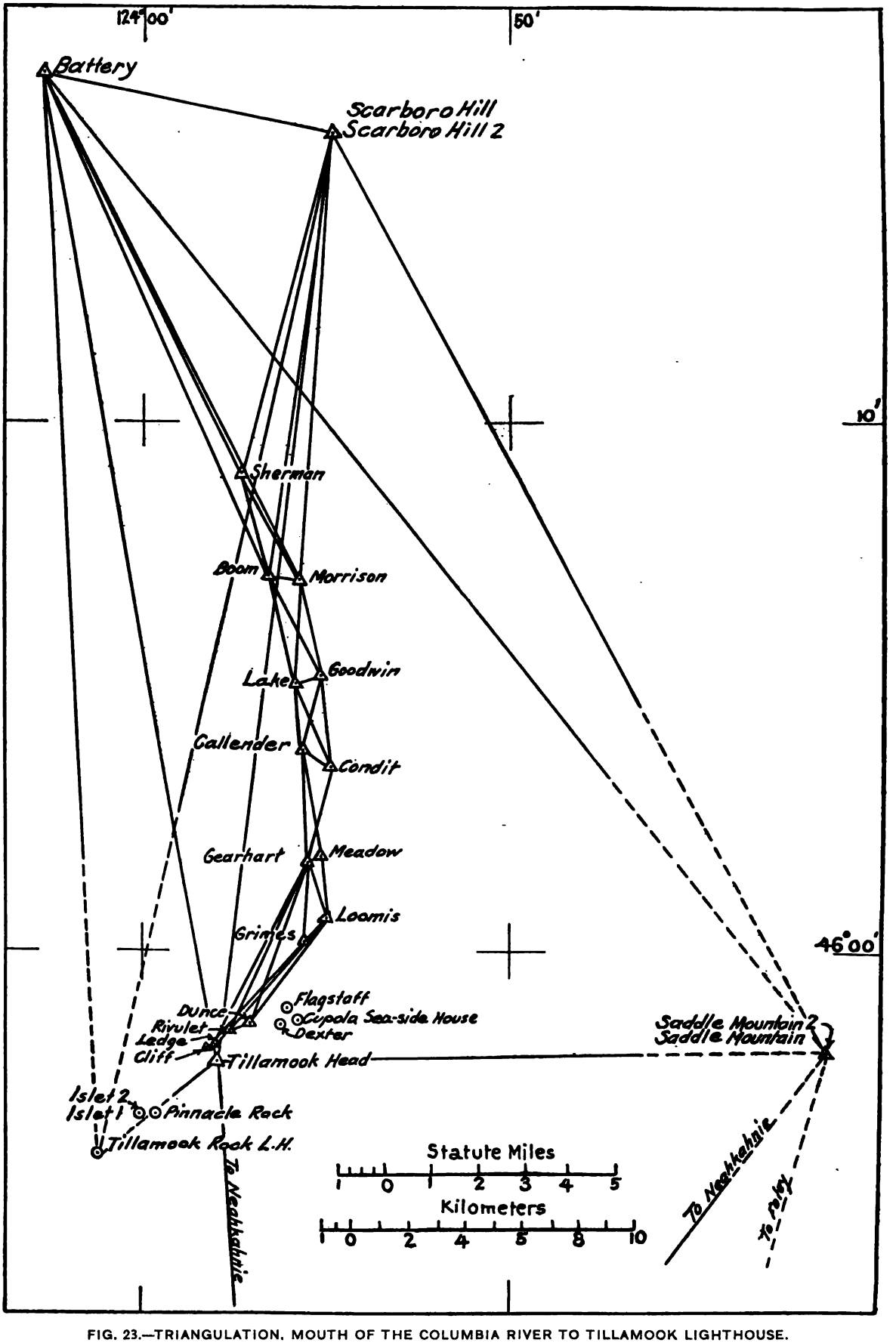


FIG. 23.—TRIANGULATION, MOUTH OF THE COLUMBIA RIVER TO TILLAMOOK LIGHTHOUSE.

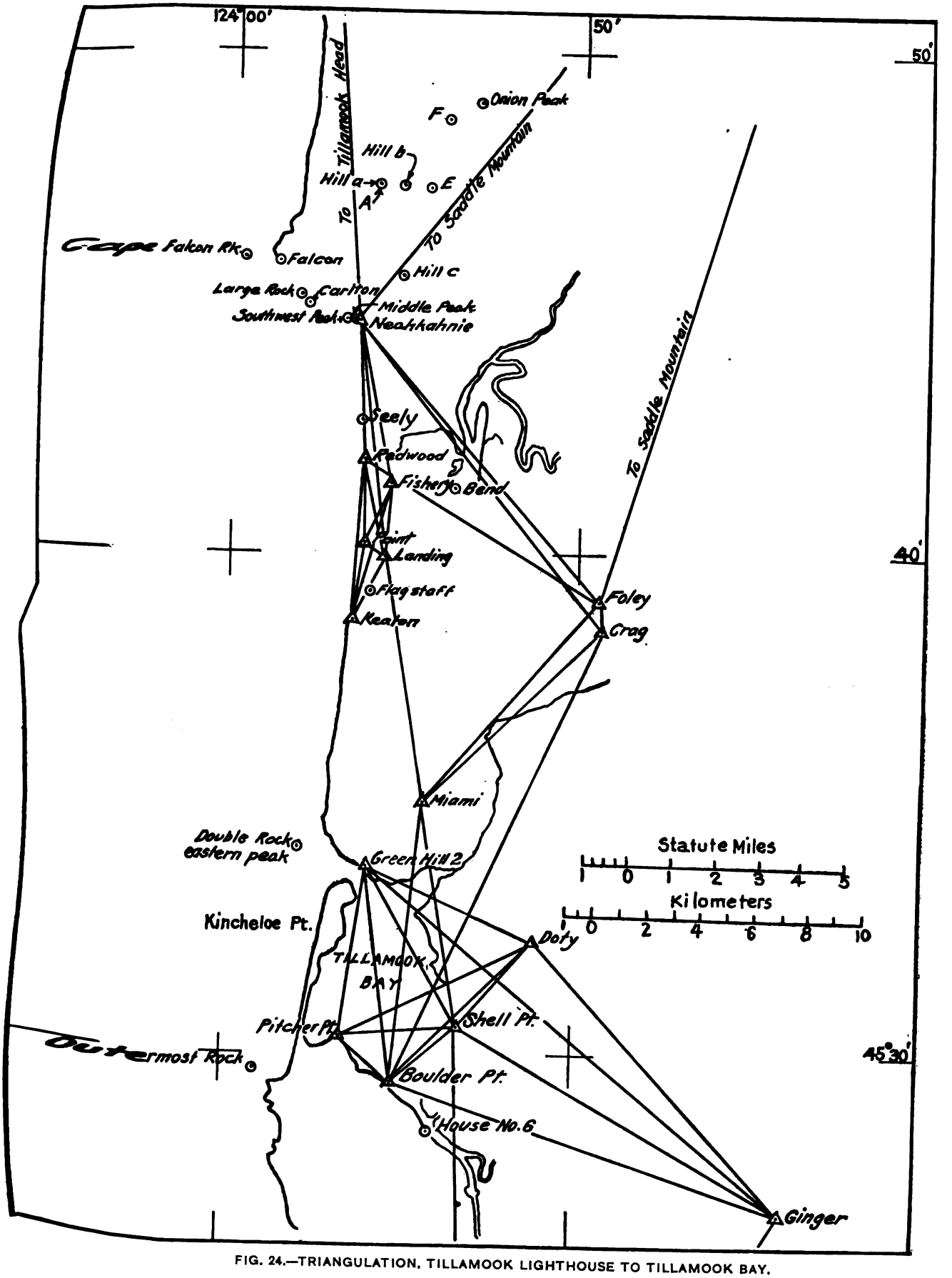


FIG. 24.—TRIANGULATION, TILLAMOOK LIGHTHOUSE TO TILLAMOOK BAY.

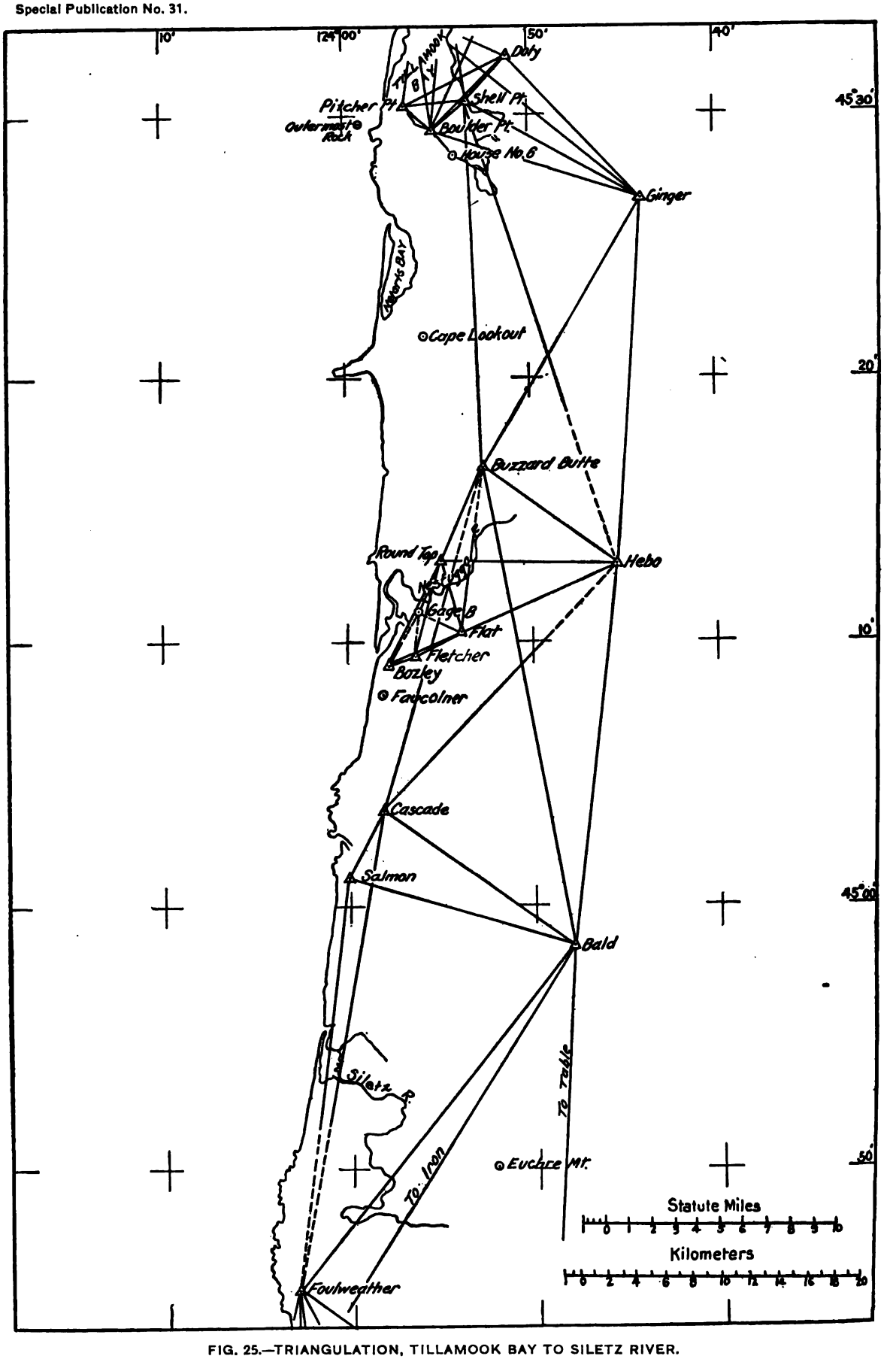


FIG. 25.—TRIANGULATION, TILLAMOOK BAY TO SILETZ RIVER.

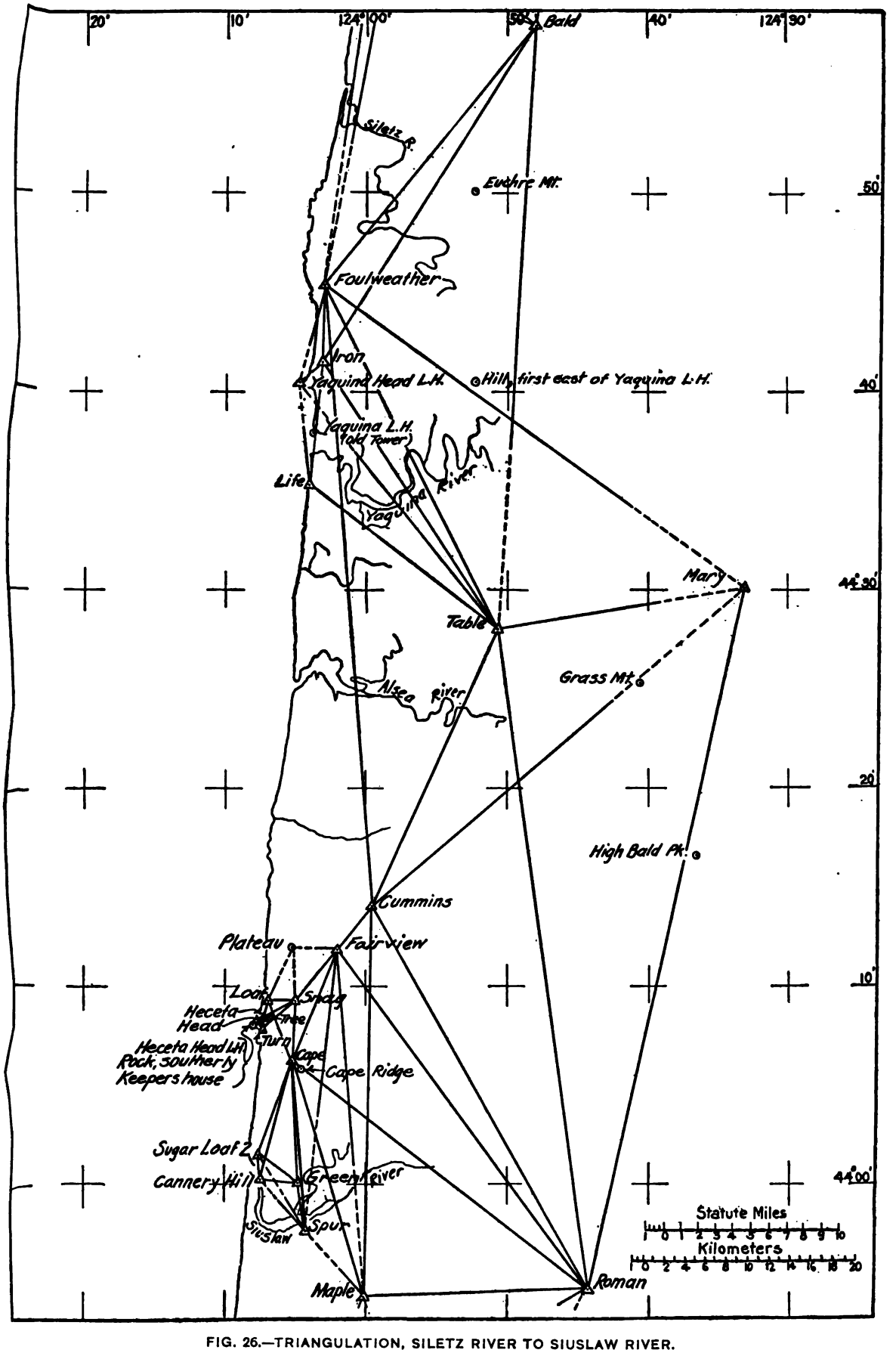


FIG. 26.—TRIANGULATION, SILETZ RIVER TO SIUSLAW RIVER.

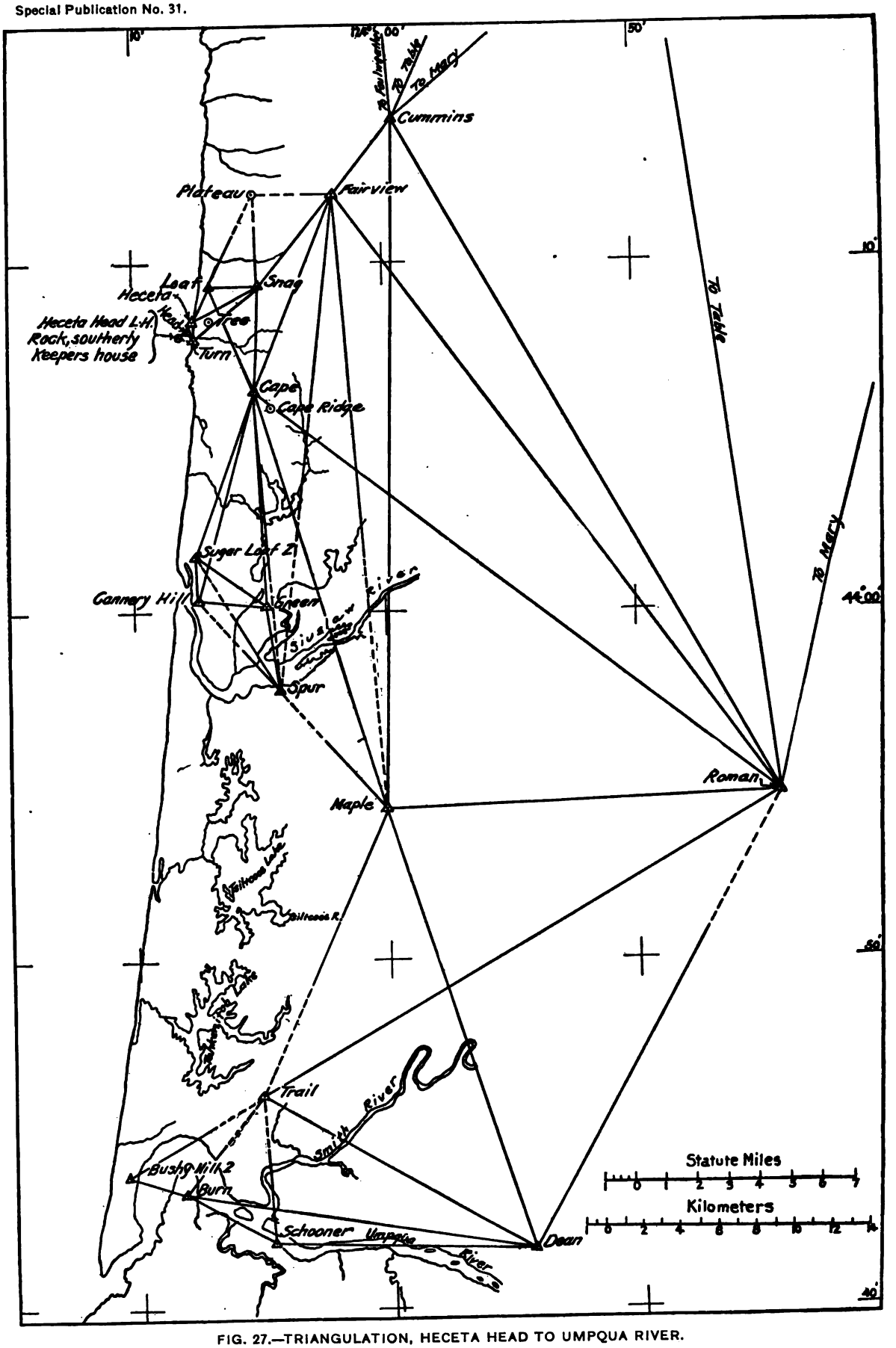


FIG. 27.—TRIANGULATION, HECETA HEAD TO UMPQUA RIVER.

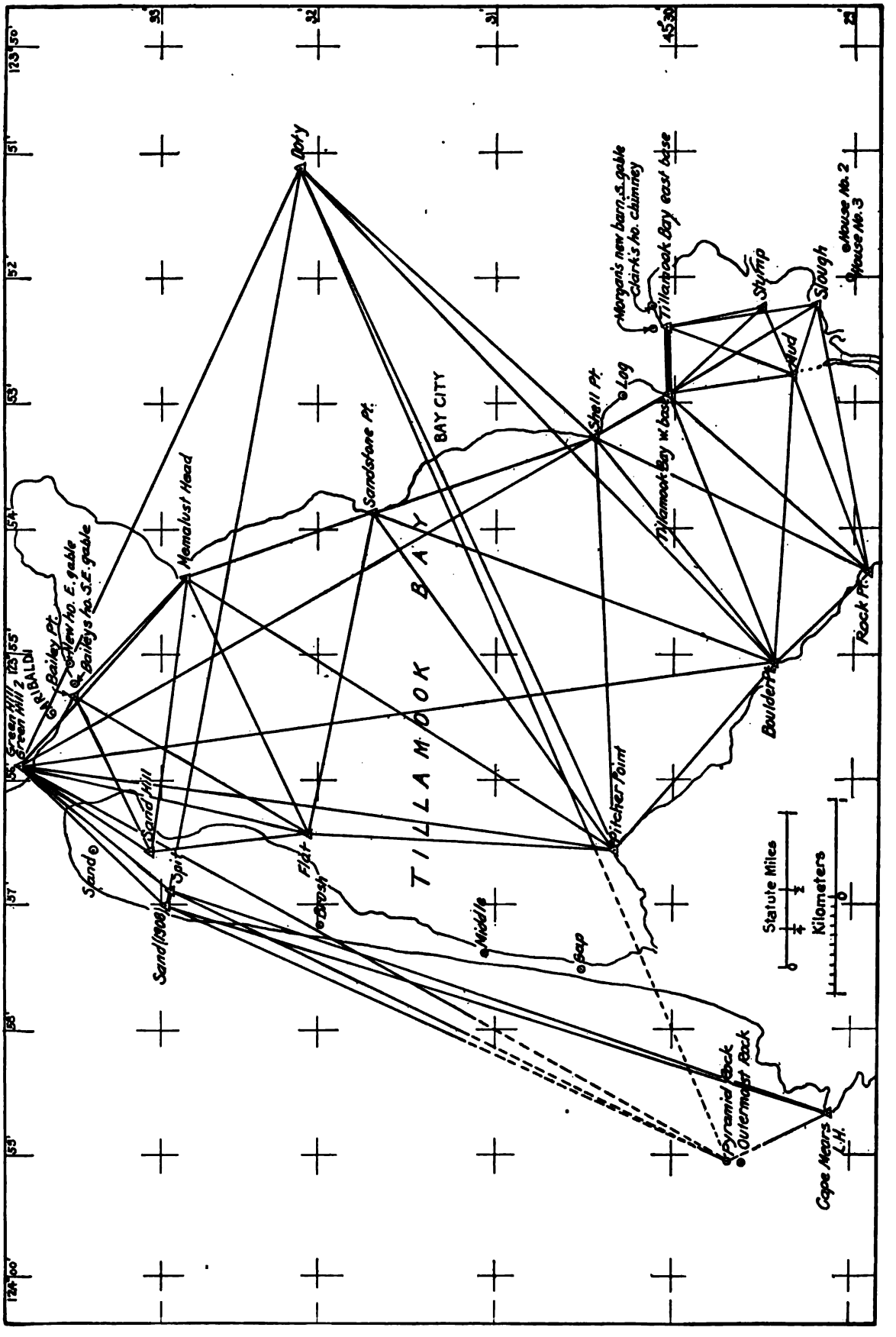


FIG. 28.—TRIANGULATION, TILLAMOOK BAY.

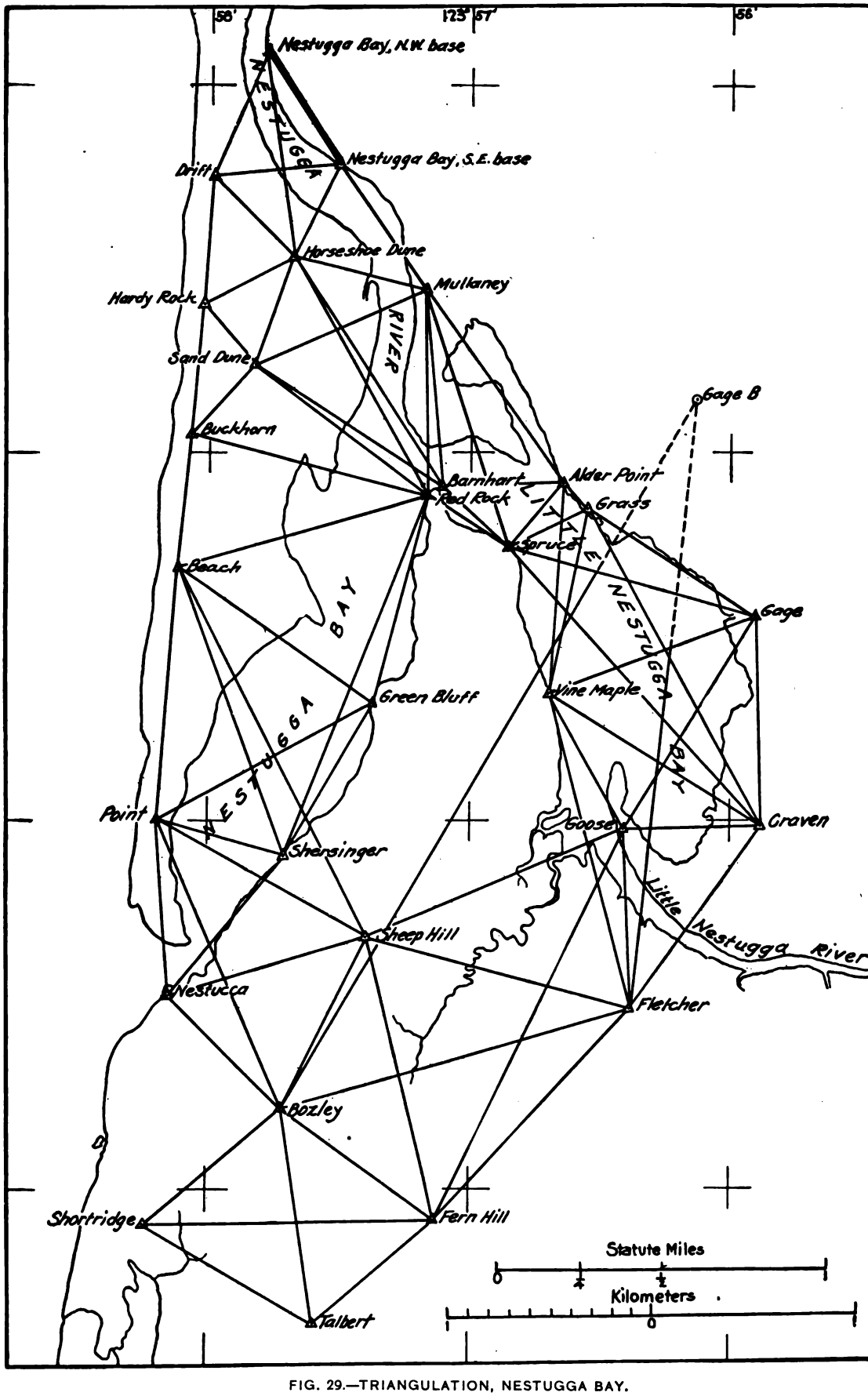


FIG. 29.—TRIANGULATION, NESTUGGA BAY.

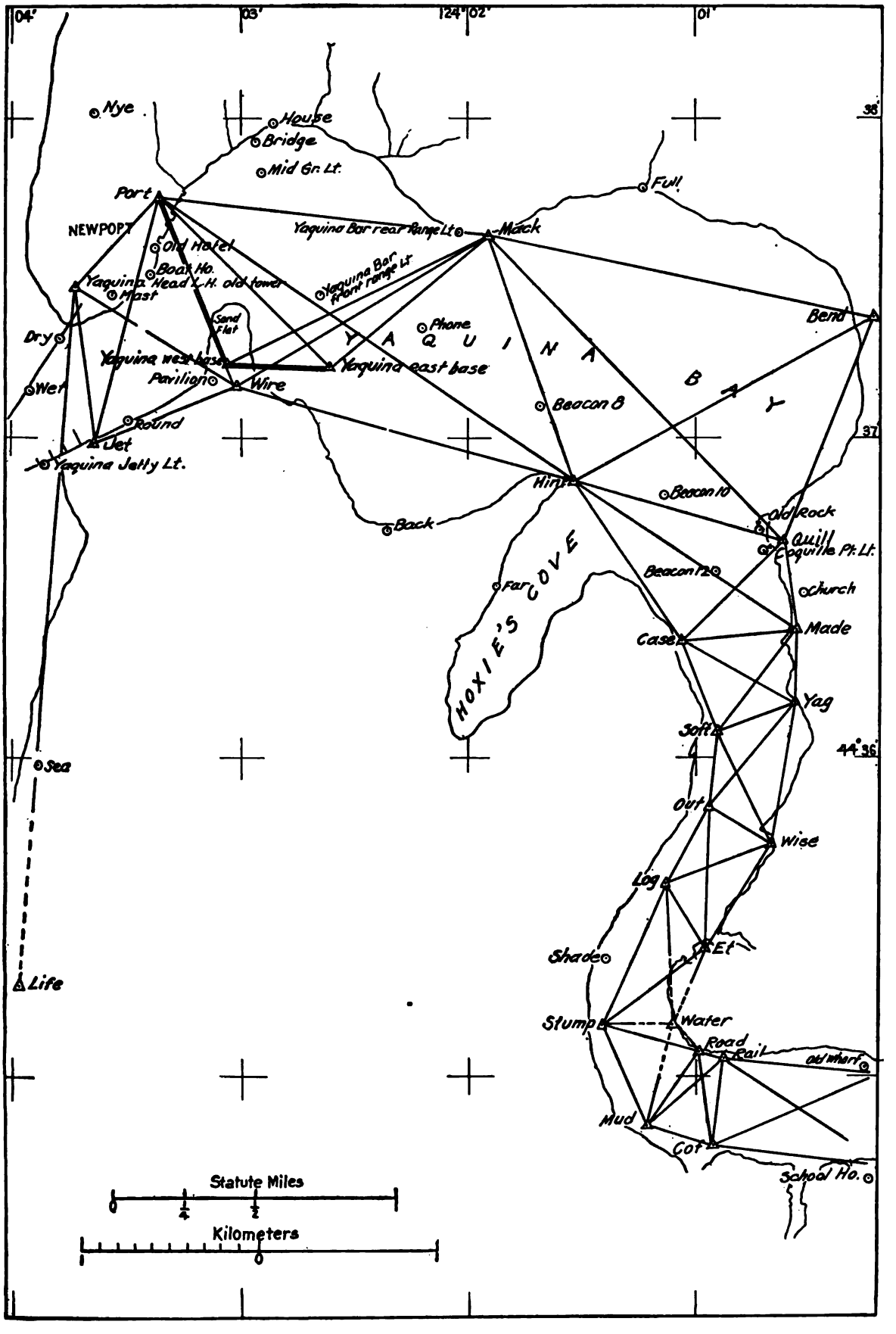


FIG. 30.—TRIANGULATION, YAQUINA RIVER FROM THE MOUTH TO THE LINE CAF-RAIL.

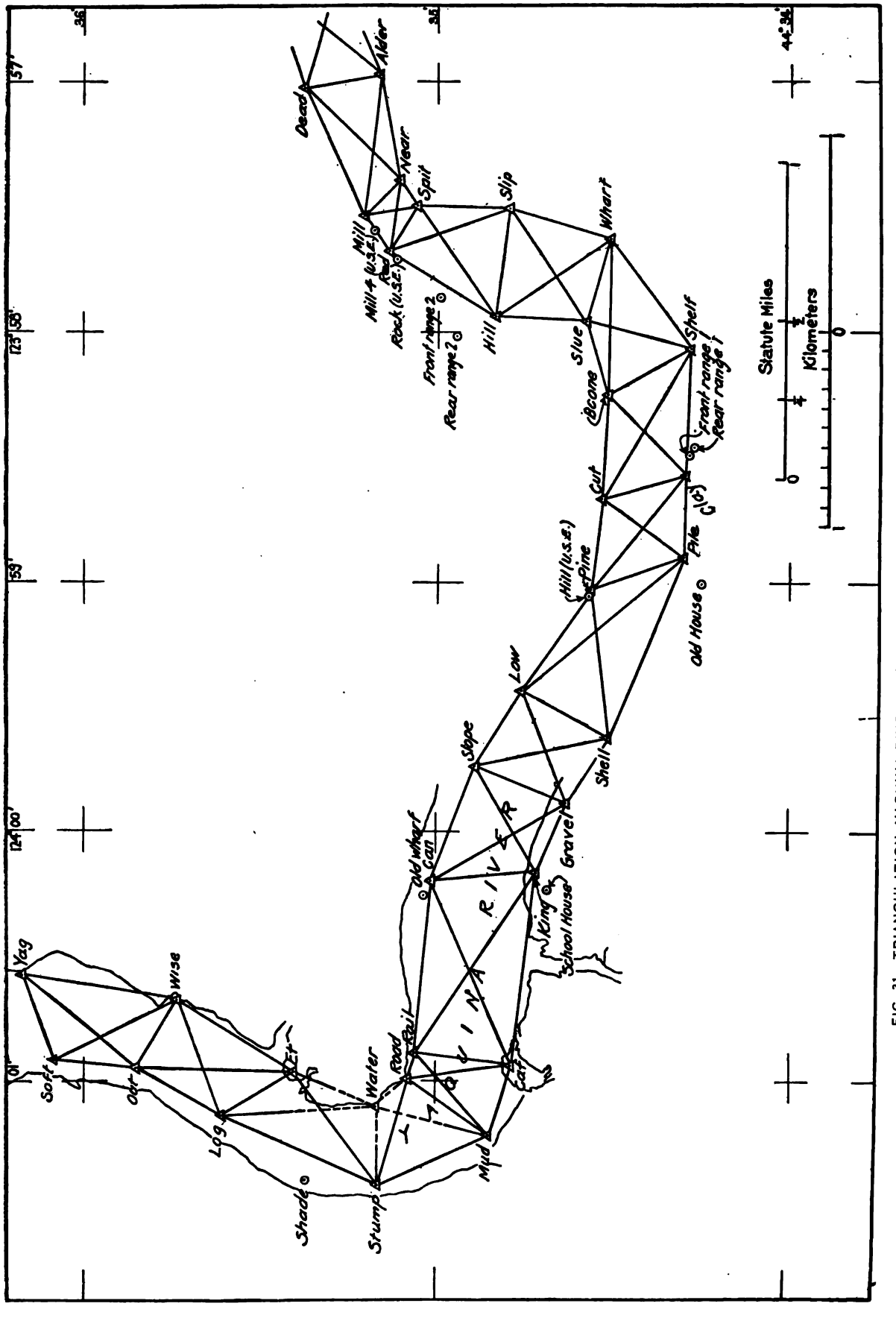


FIG. 31.—TRIANGULATION, YAQUINA RIVER, FROM THE LINE SOFT-YAQ TO THE LINE DEAD-ALDER.

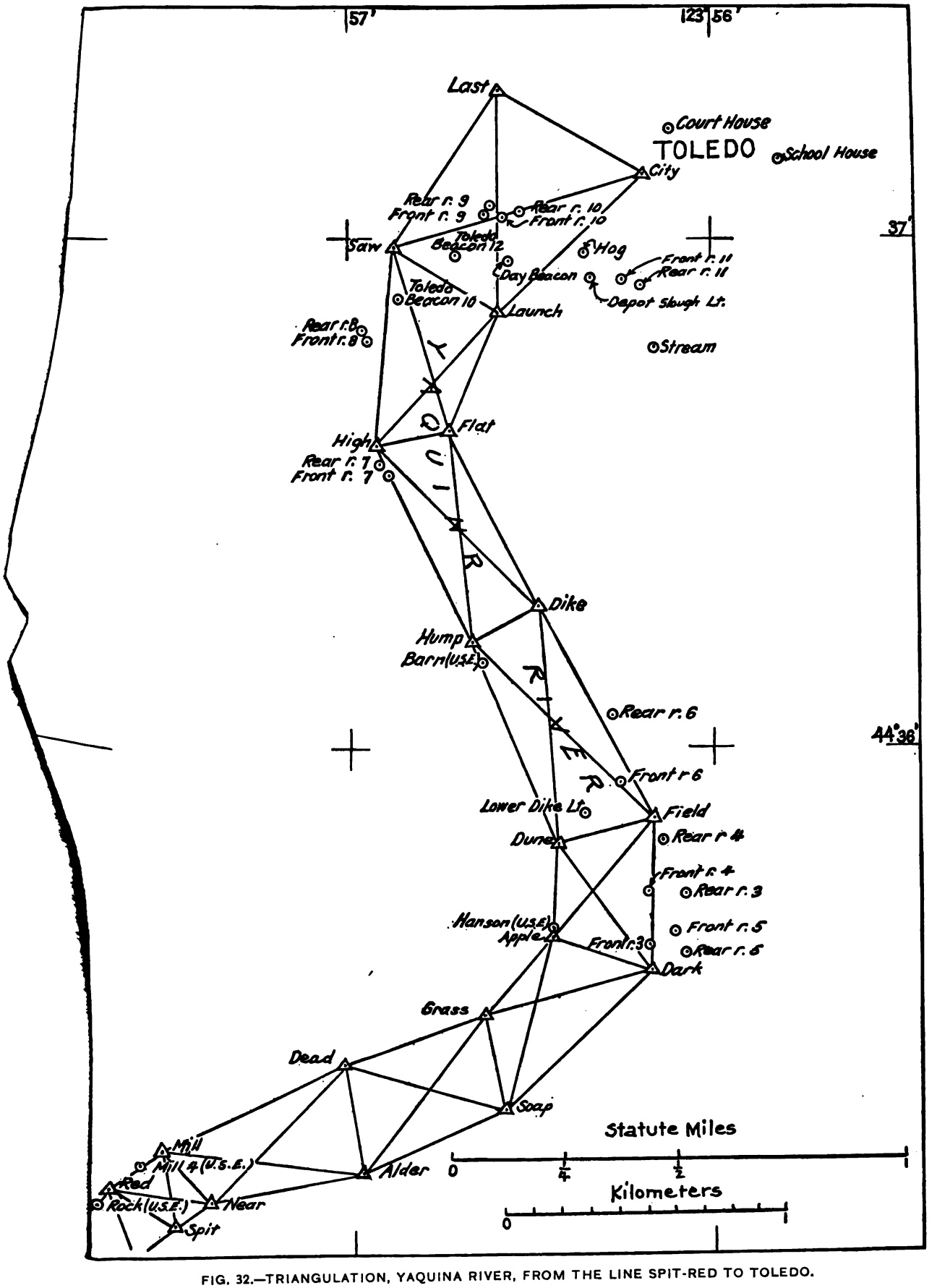


FIG. 32.—TRIANGULATION, YAQUINA RIVER, FROM THE LINE SPIT-RED TO TOLEDO.

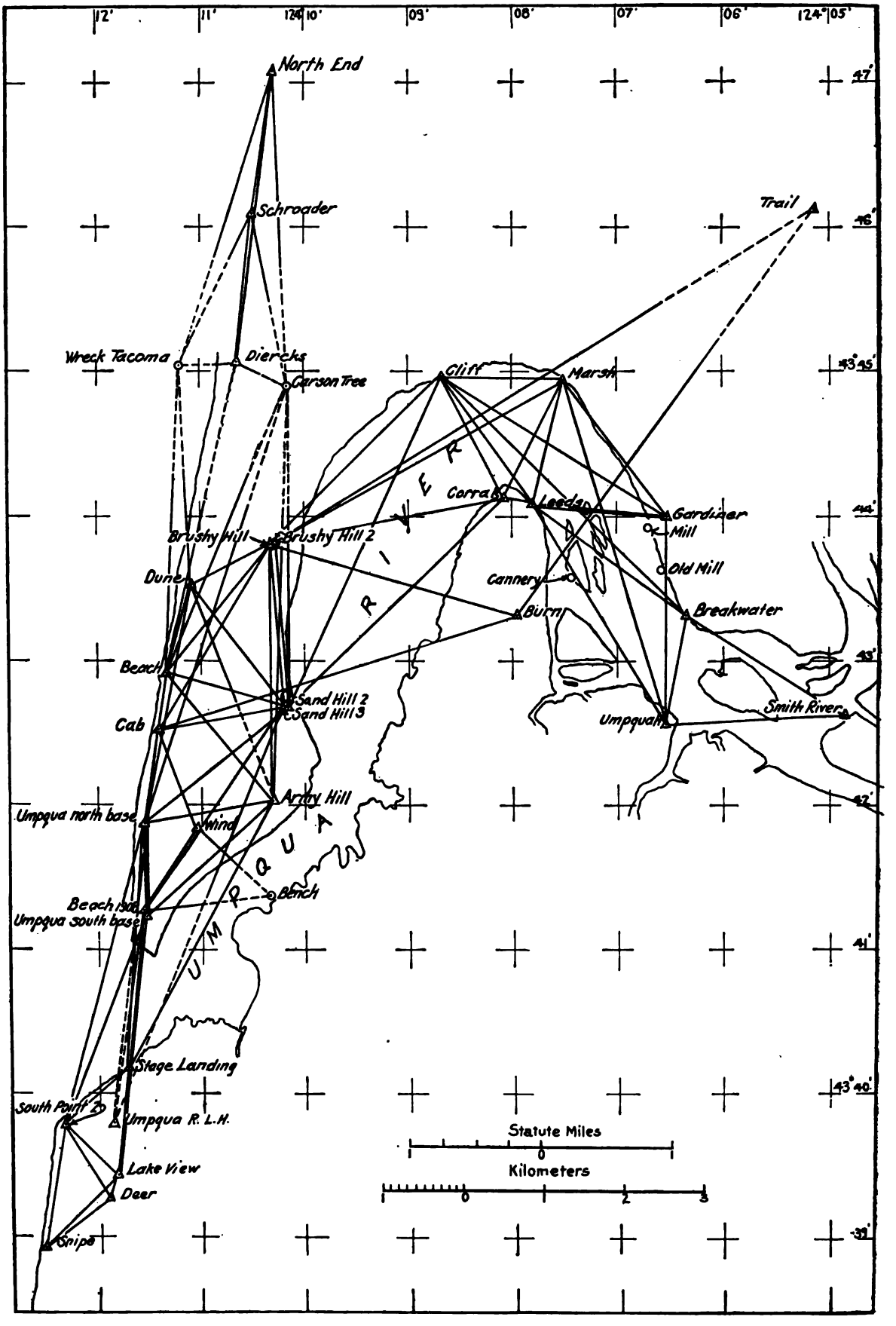


FIG. 33.—TRIANGULATION, UMPQUA RIVER.

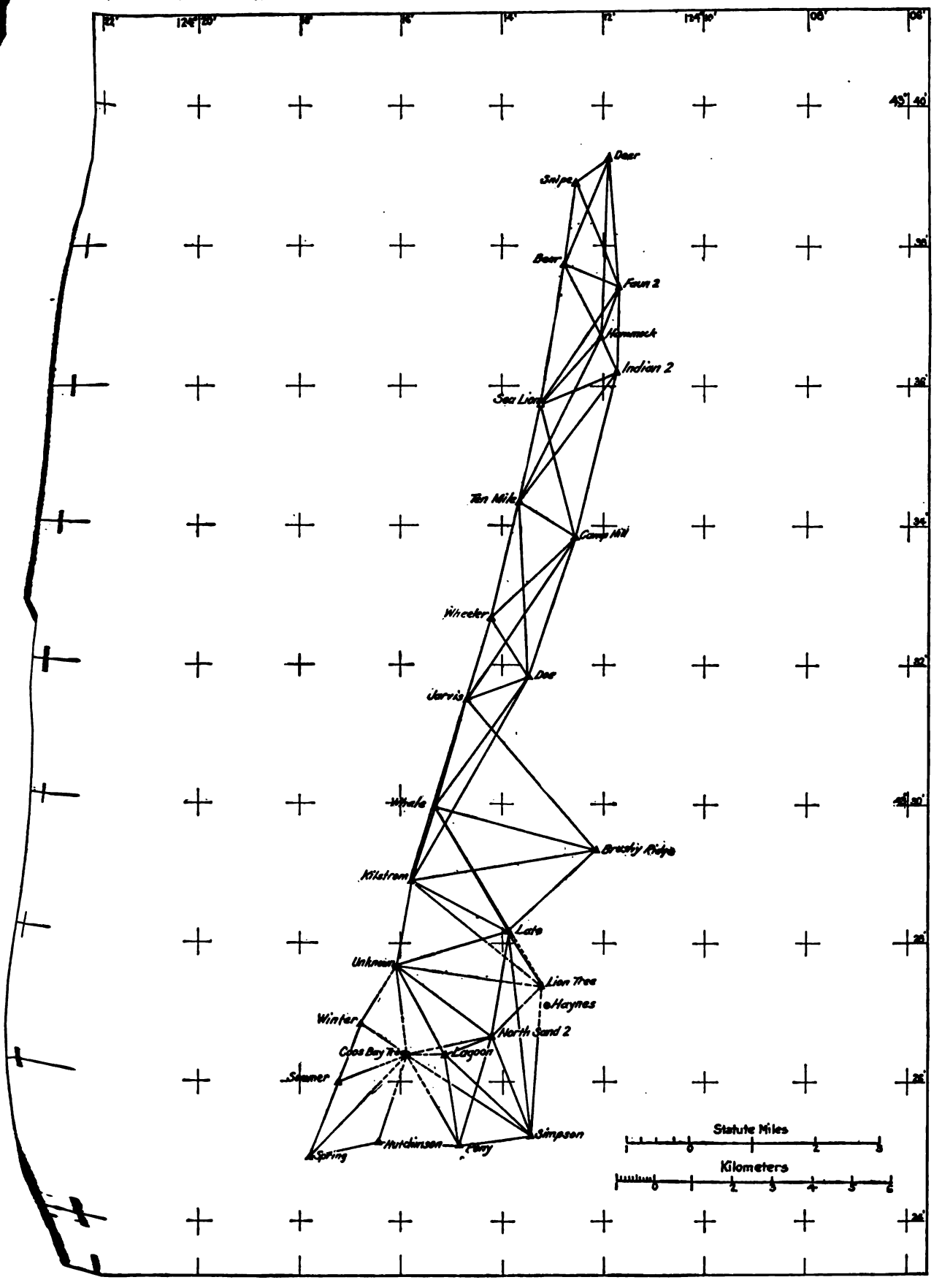


FIG. 34.—TRIANGULATION, UMPQUA RIVER TO COOS BAY.

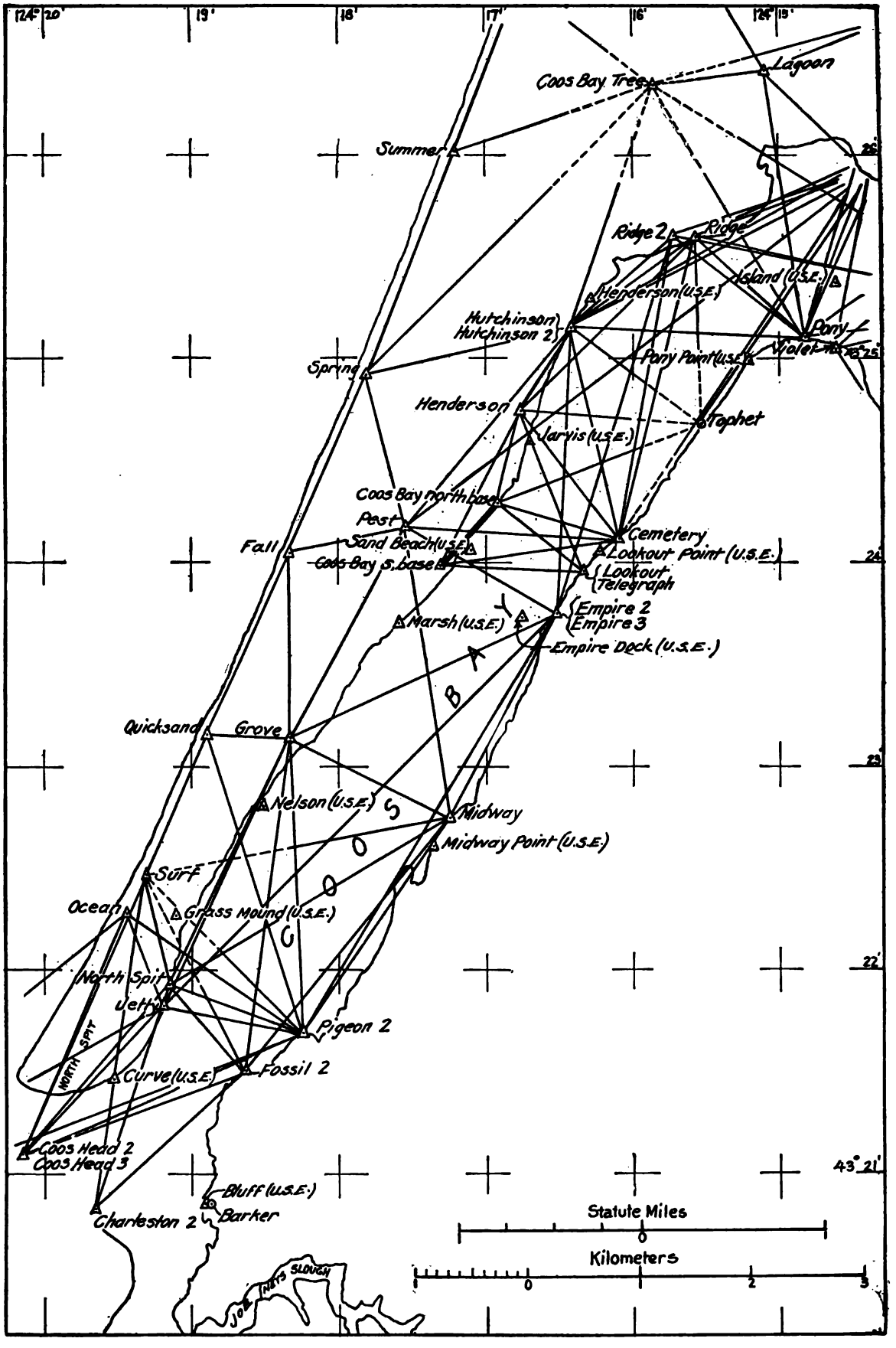


FIG. 35.—TRIANGULATION, COOS BAY, WESTERN HALF.

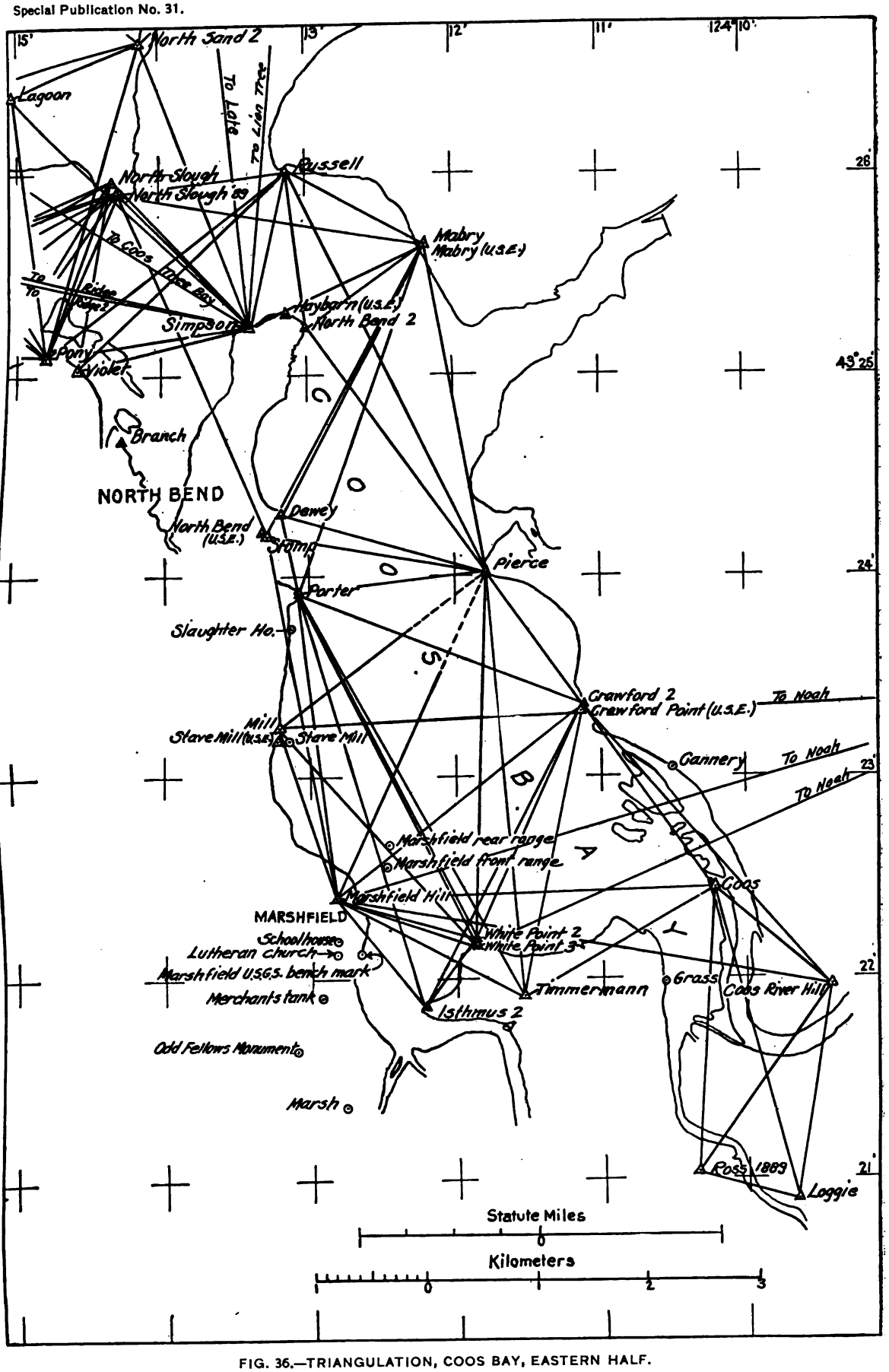


FIG. 36.—TRIANGULATION, COOS BAY, EASTERN HALF.

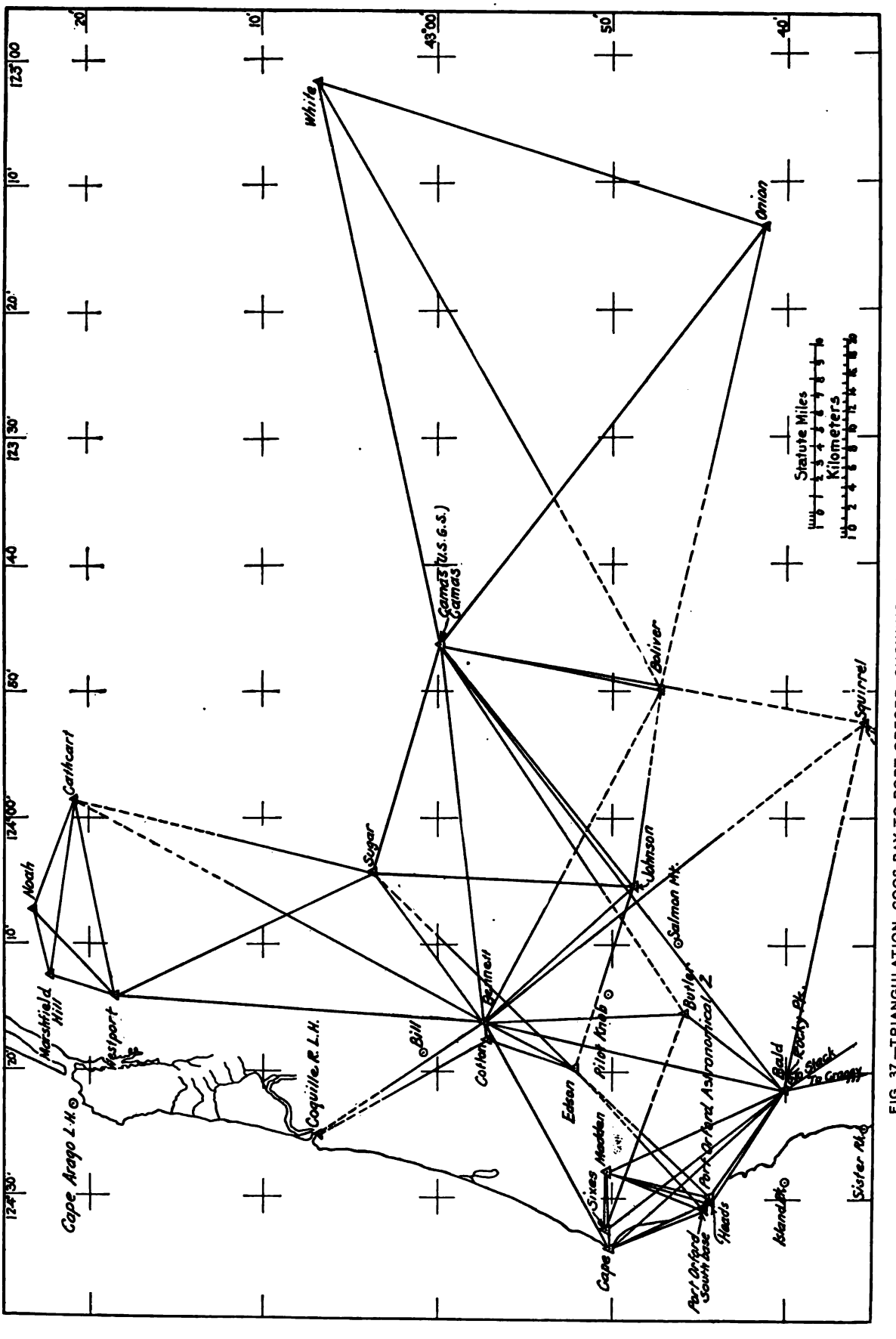


FIG. 37.—TRIANGULATION, COOS BAY TO PORT ORFORD, SHOWING CONNECTION TO THE PRIMARY TRIANGULATION.

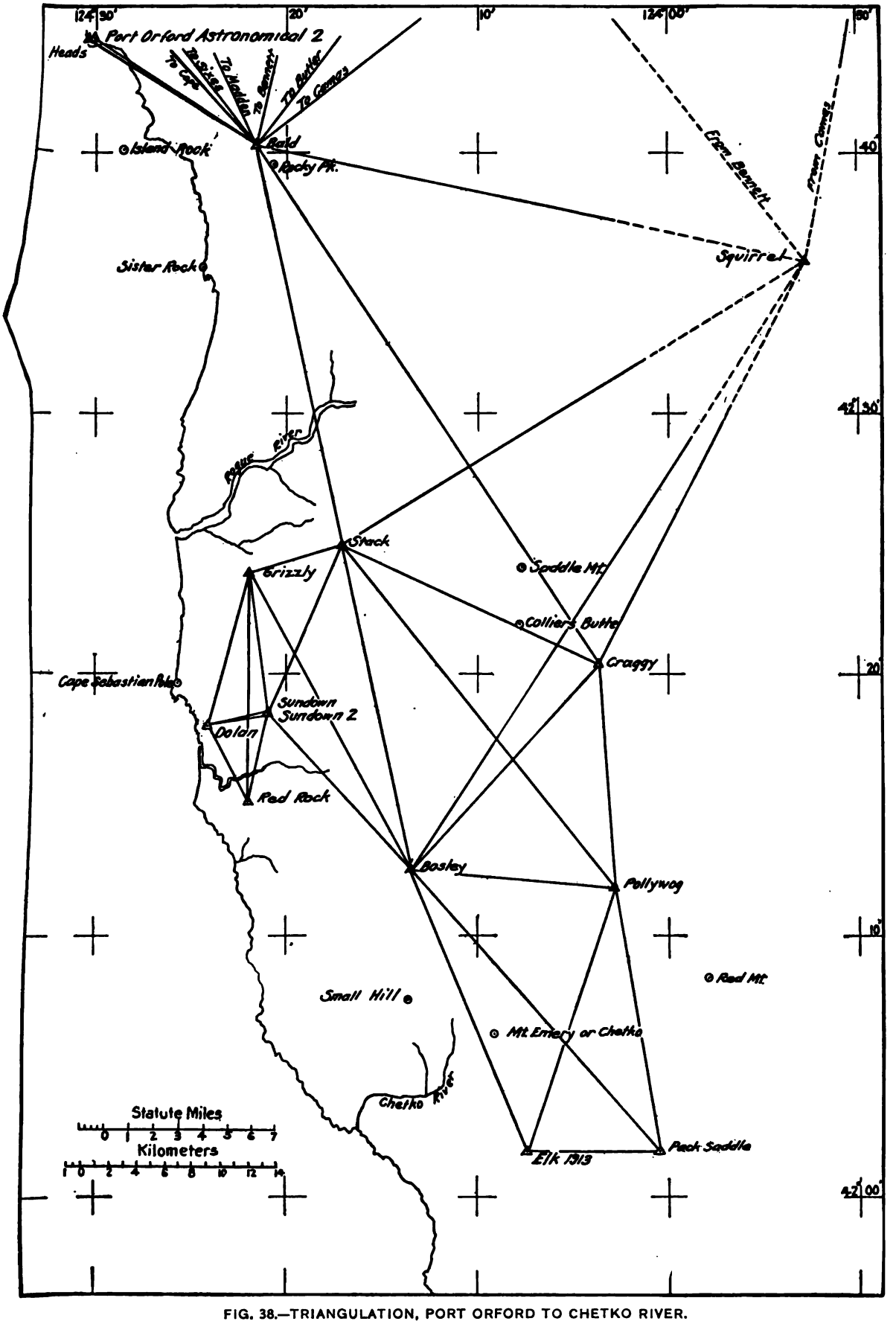


FIG. 38.—TRIANGULATION, PORT ORFORD TO CHETKO RIVER.

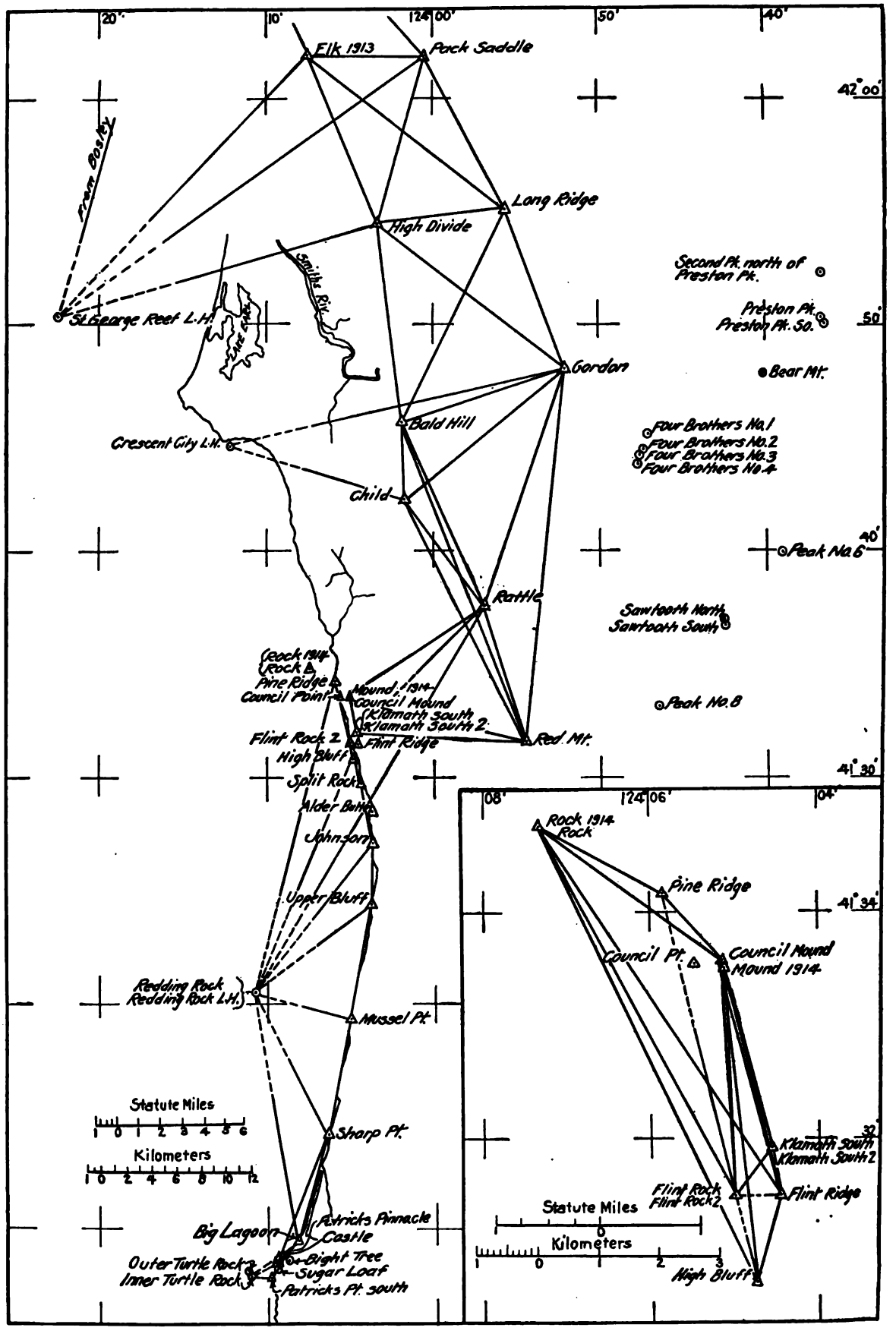


FIG. 39.—TRIANGULATION, CHETKO RIVER TO TRINIDAD HEAD.

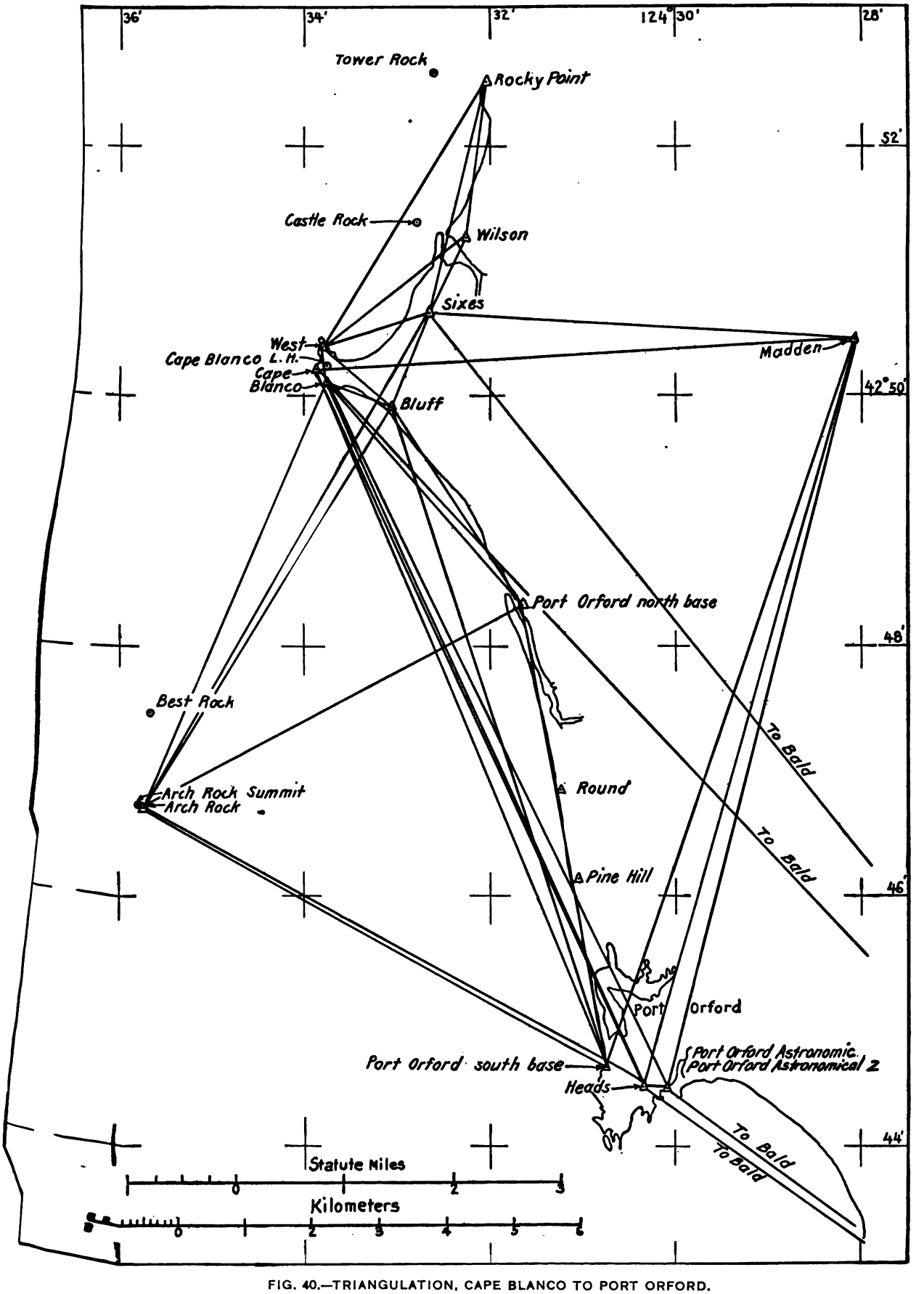


FIG. 40.—TRIANGULATION, CAPE BLANCO TO PORT ORFORD.

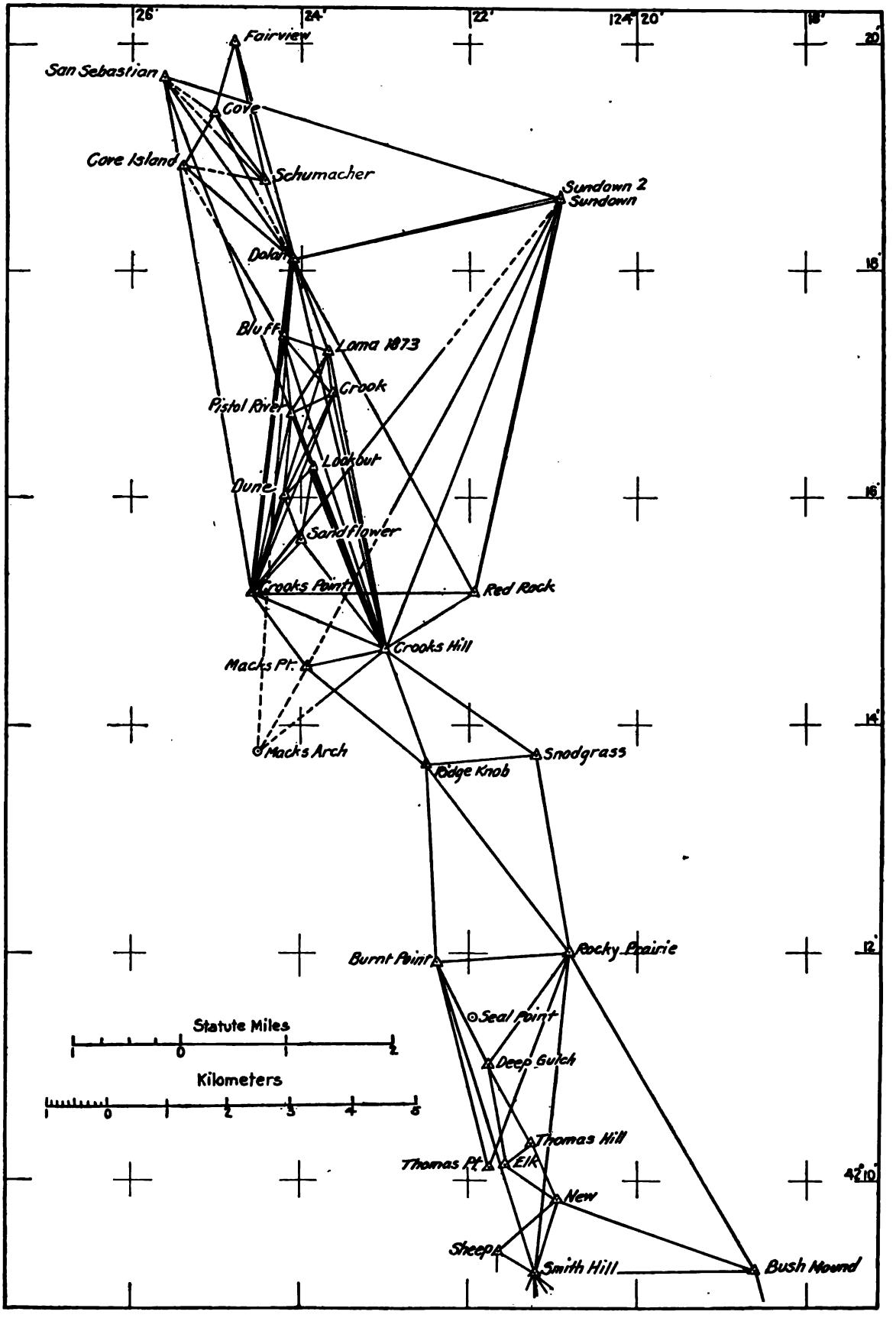


FIG. 41.—TRIANGULATION, SAN SEBASTIAN TO CAPE FERRELO.

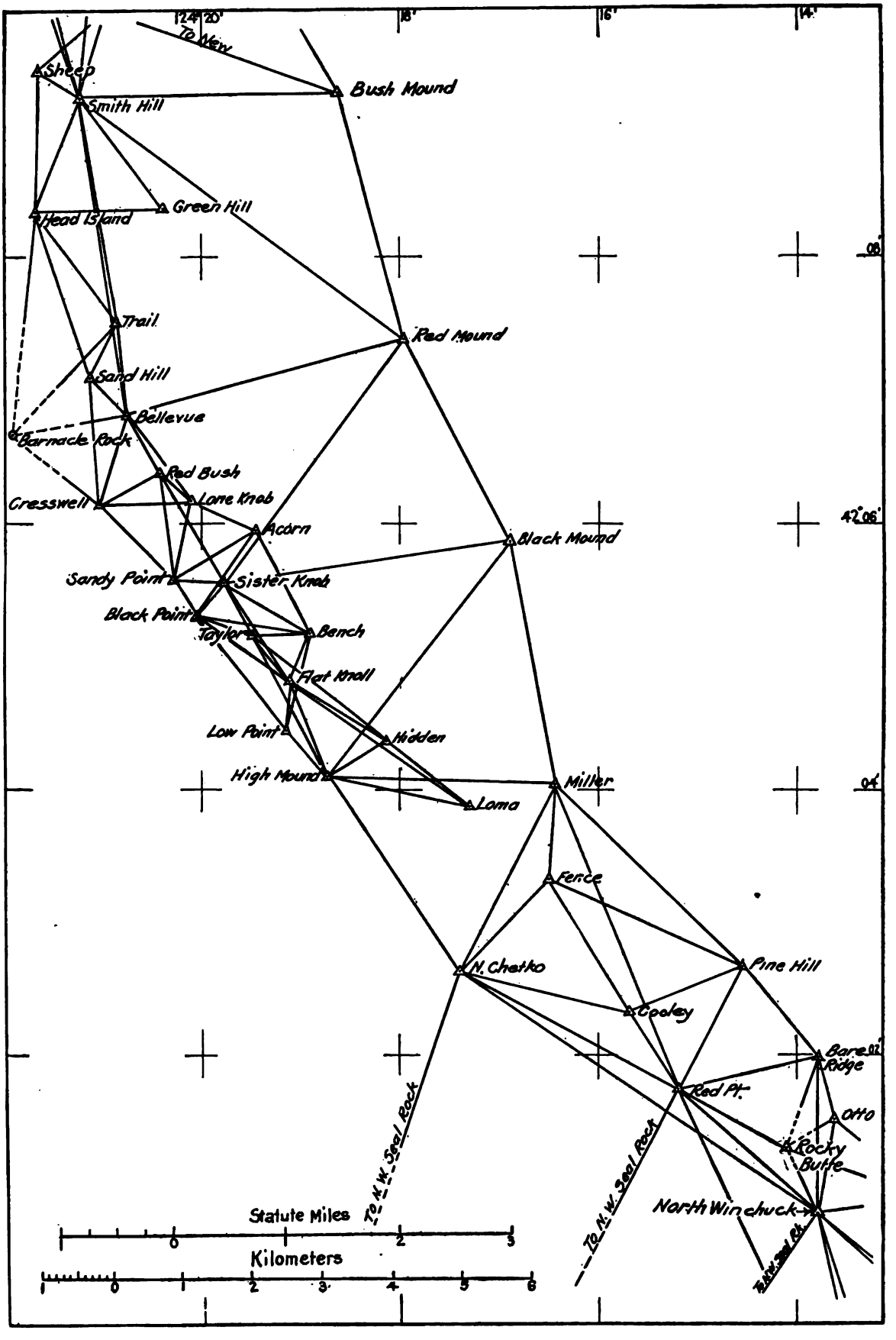


FIG. 42.—TRIANGULATION, CAPE FERRELO TO WINCHUCK RIVER.

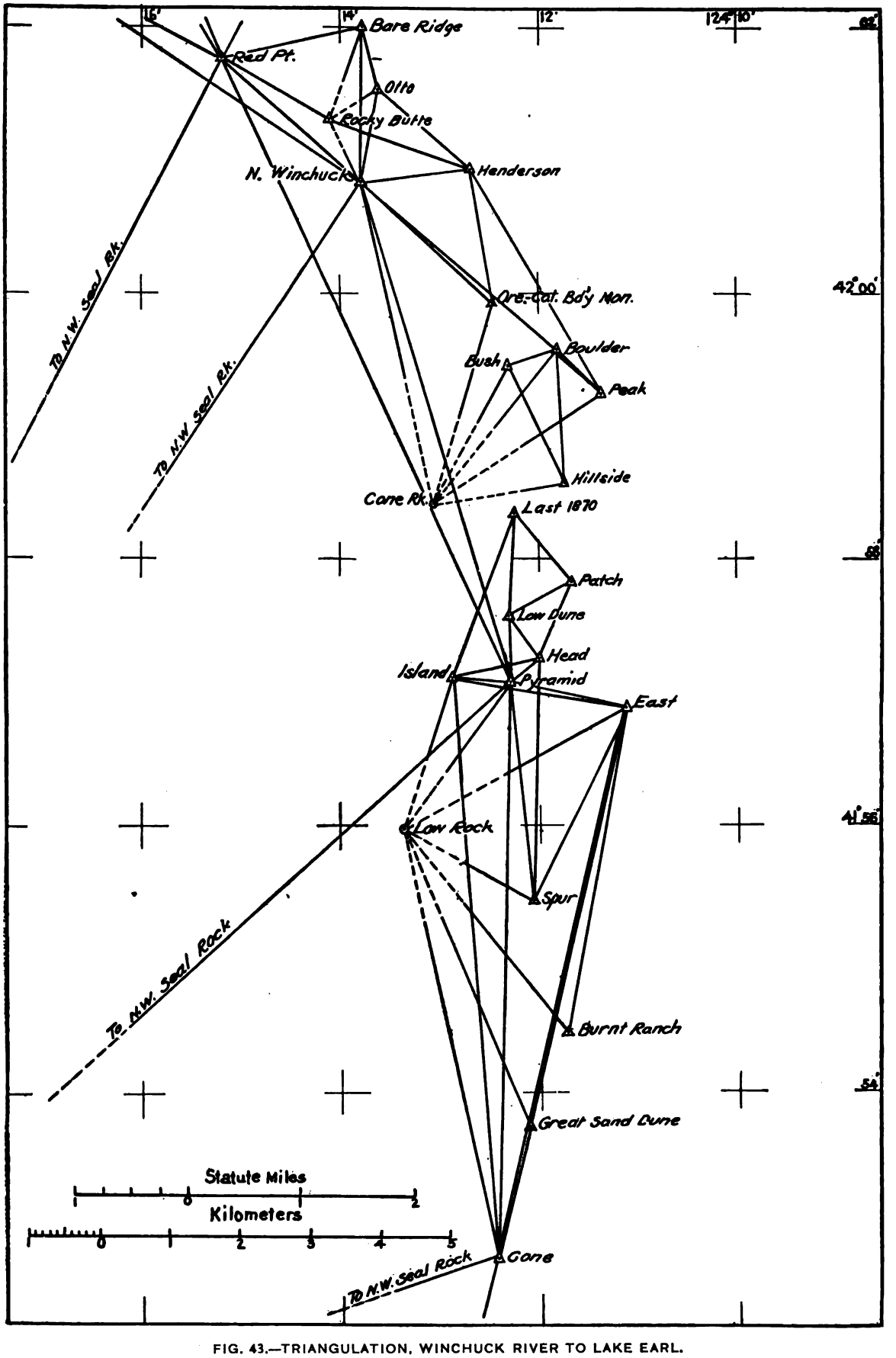


FIG. 43.—TRIANGULATION, WINCHUCK RIVER TO LAKE EARL.

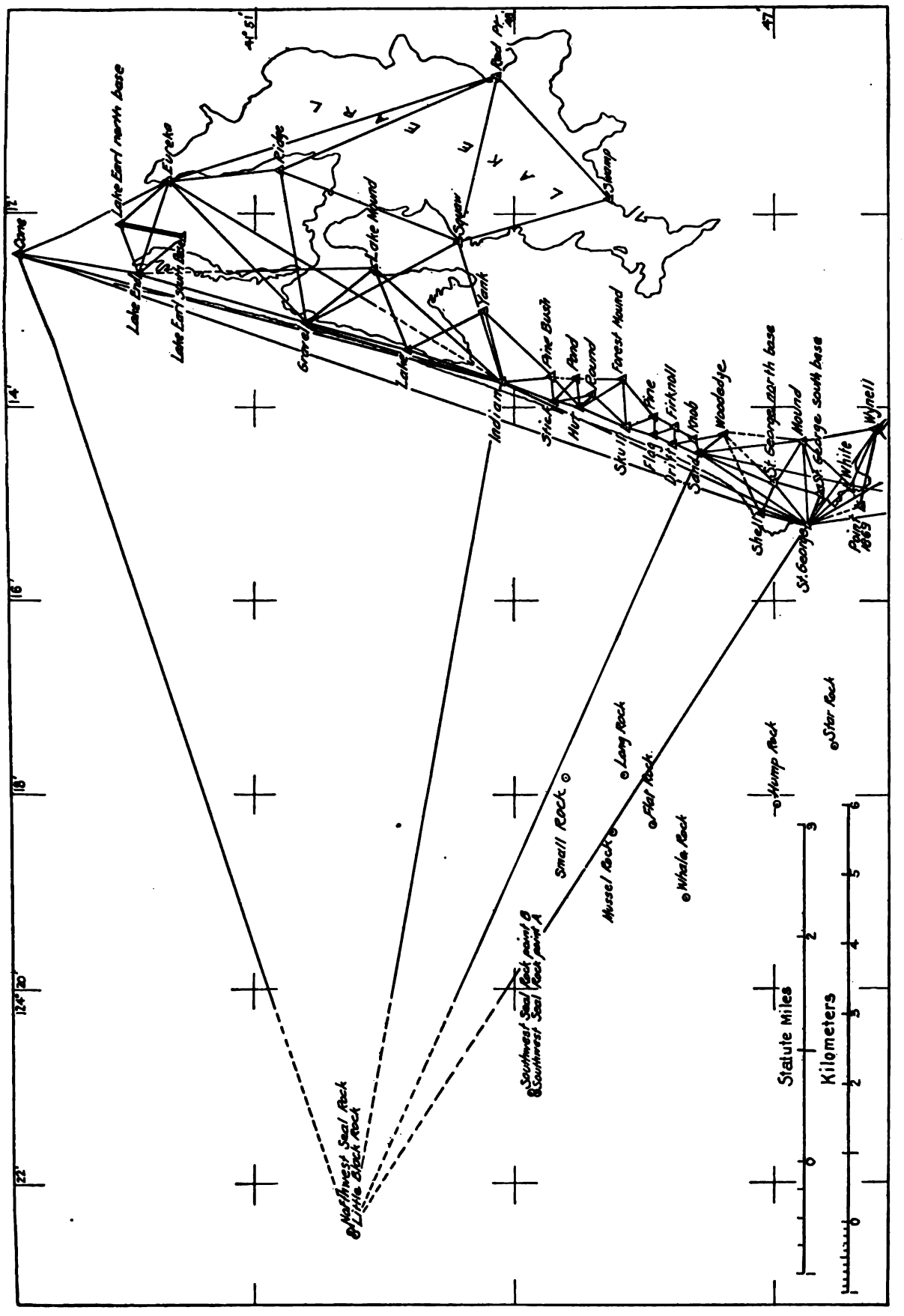


FIG. 44.—TRIANGULATION. LAKE EARL TO POINT ST. GEORGE.

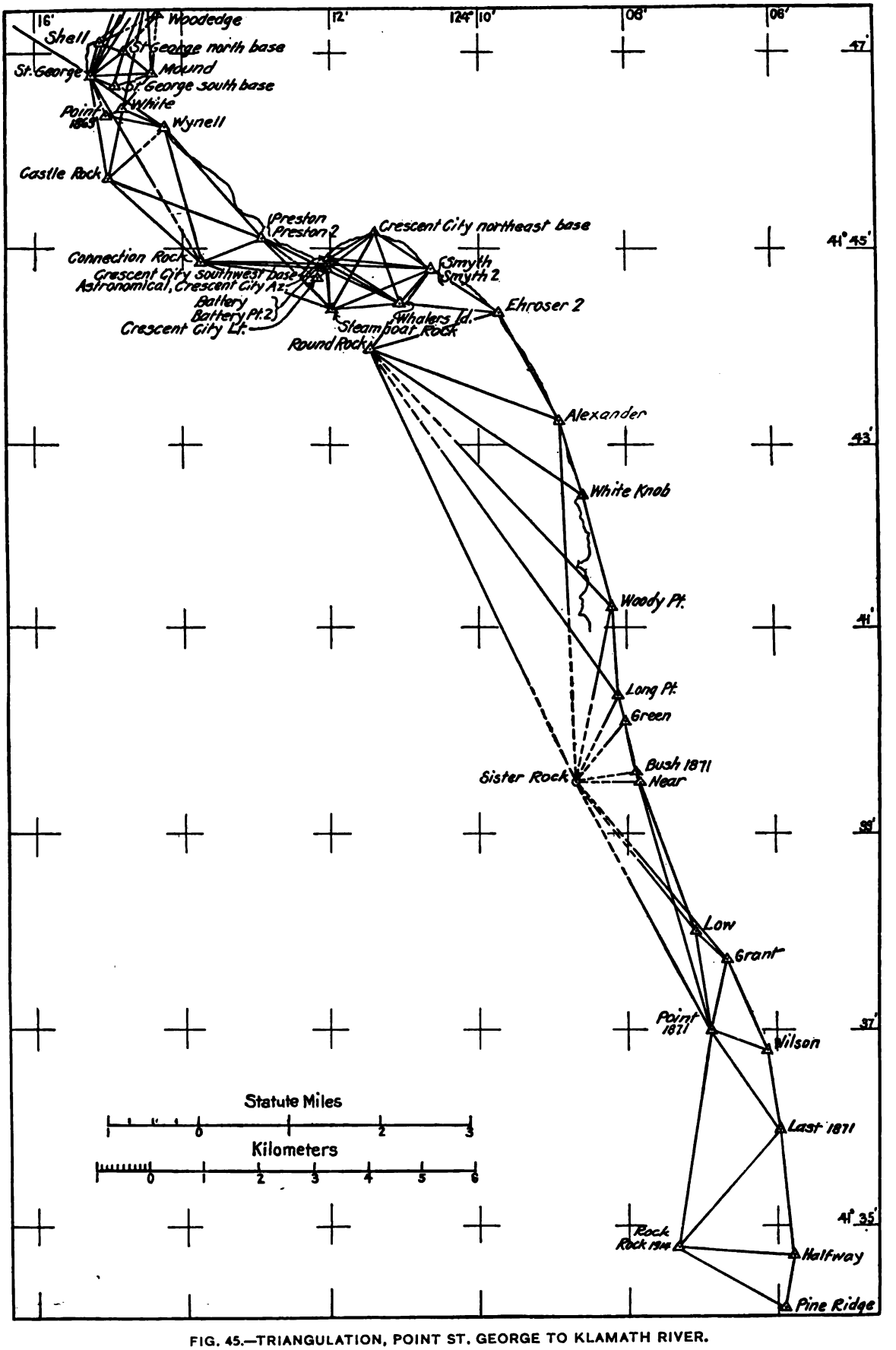


FIG. 45.—TRIANGULATION, POINT ST. GEORGE TO KLAMATH RIVER.

INDEX.

Station	Position	Description	Elevation	Sketch
	Page	*Page*	*Page*	*Number*
A	55			24
A (U. S. E.)	25	93		17
A (U. S. E.) reference mark	25			
A 2 (U. S. E.)	21	88		15
Abernathy	17	84		14
Abrams	41	100		17
Acorn	72	125		42
Adair School cupola, Astoria	32			12
Adams	40	99		17
Ahle Point light	38			16
Ahles	80			
Alamicut Point	34	98		13
Alder (Coos County)	78			
Alder (Lincoln County)	59	118		31, 32
Alder Bluff	36	99		14
Alderbrook (U. S. E.)	33	98		12, 13
Alderbrook School cupola	33			12, 13
Alder Butte	77	131		39
Alder Point	57	115		29
Aldrich (Clatsop County)	17	83		13
Aldrich (Skamania County)	46	104		22
Alexander	76	130		45
Allman	45	102		19
Altoona Cannery main building, south gable	34			13
Anderson	17	84		14
Angel	46	103		22
Apple	60	118		32
Arch Rock	70	123	133	40
Arch Rock Summit	70	123		40
Army Hill	64			33
Astoria (U. S. E.)	33	98		
Astoria:				
Adair School cupola	32			12
Courthouse dome	32			12
Finnish Lutheran Church spire	33			12
Marconi northeast wireless	33			12
Marconi southwest wireless	33			12
Range, front light	33			12
Range, rear light	33			12
St. Mary's Hospital cross	16			12
Smith Point iron chimney	32			12
Taylor School cupola	32			12
Weather Bureau Tower flagpole	33			12
Astor Point	16	83		12
Astronomical	76	130		45
B (U. S. E.)	25	93		17
B (U. S. E.) reference mark	25			
Bachelors Island	80			
Bachelors Point light	41			17
Back	61			30
Bailey Point	56	113		28
Bailey's house, southeast gable	56			28
Baker east base	16	83		12
Baker (new)	19			12
Bakers Bay	80			
Baker west base	16	83		12
Balch	19	87		20, 21
Bald (Curry County)	50	109	133	37, 38
Bald (Lincoln County)	49	106	132	25, 26
Bald Hill	51	110	133	39
Balsam	40	99		17
Bank	21	90		16
Bank reference mark	22			
Bare Ridge	73	126		42, 43
Barker	69	123		35
Barlow	20	88		14, 15
Barlow Point range front light	36			14, 15
Barlow Point range rear light	36			14, 15
Barlow reference mark No. 1	20			
Barlow reference mark No. 2	20			
Barn (U. S. E.)	62			32
Barnacle Rock	72	125		42
Barnes	19	86		20
Barn, gable	38			16
Barnhart	57	115		29
Barn near McGowans, north gable	48			22
Barn, north gable	80			
Barn, west gable	48			22
Bartletts barn, north gable	47	105		21
Battery (Del Norte County, Cal.)	76	130		45
Battery (Pacific County, Wash.)	16	82	133	12, 23
Battery Point 2	76	129		45
Bay	79			
Bay View light	35			13, 14
Bay View light, new	35			13, 14
Beach (Coos County)	78			
Beach, 1885 (Douglas County, Umpqua River)	64		132	33
Beach, 1908 (Douglas County)	64	120		33
Beach (Tillamook County, Nestugga Bay)	57	114		29
Beach (Tillamook County, Tillamook Bay)	80			
Beach 2 (U. S. E.)	21	88		15
Beacon	80			
Beacon 8	61			30
Beacon 10	61			30
Beacon 12	61			30
Beacon No. 1	34			12, 13
Beacon No. 2	34			13
Beacon No. 4	34			13
Bear	66			34
Bear (U. S. E.)	33	98		13
Bear Mountain	52	111	133	39
Beaver	78			
Beaver Dock building, north gable	37			15
Beaver Lumber Co. tank	38			16
Beaver Lumber Co. west stack	38			16
Bellevue	72	124		42
Bench (Curry County)	73	125		42
Bench (Douglas County)	64	119	132	33

Station	Position	Description	Elevation	Sketch
	Page	*Page*	*Page*	*Number*
Bend (Lincoln County)	58	116		30
Bend (Tillamook County)	55	113		24
Bend (U. S. E.)	39	99		16, 17
Bennett	50	108	133	37
Best Rock	70	123		40
Big Barn, east gable	47			21
Big Barn, south gable	47			22
Bight	78			
Bight tree	77	131		39
Big Lagoon	77	131		39
Bill	52	111	133	37
Birnie	17	83		14
Birnie house, northwest gable	35			14
Black Mound	72	124		42
Black Point	72	125		42
Blanco	70	123		40
Bluff (Coos County)	78			
Bluff (Curry County)	71	124		41
Bluff (Curry County, near Cape Blanco)	70	123		40
Bluff (Skamania County, Wash.)	46	104		22
Bluff (U. S. E.) (Columbia County)	21	89		15
Bluff (U. S. E.) (Coos County)	68	122		35
Bluff (U. S. E.) (Cowlitz County, Wash.)	39	99		16, 17
Bluff (U. S. E.), (Pacific County, Wash.)	19			12
Boathouse, east gable	60			30
Boliver	50	108	133	37
Bonneville	46	104		22
Boom	53	111		23
Boone	59	117		31
Bosley	51	109	133	38
Boulder	73	126		43
Boulder Point	50	107	132	24, 25, 28
Bourne (U. S. E.)	21	88		15
Bourne's house, west gable	37			15
Bouser	18	86		20
Bozley	56	114	132	25, 29
Bradbury	17	84		14
Bradford	46	105		22
Branch	68	122		36
Breakwater	65			33
Bridal Veil sawmill	48			22
Bridge, center of draw, Vancouver	43			19
Bridge, Yaquina Bay	60			30
Brookfield cannery	35			13
Brookside	41	100		20
Brush (Multnomah County)	45	103		21
Brush (Tillamook County)	56	113		28
Brush 2 (U. S. E.)	26			18
Brushy Hill	64			33
Brushy Hill 2	64	119	132	27, 33
Brushy Ridge	65			34
Buckhorn	57	115		29
Bugby Hole Eccentric	36	98		14
Bugby Hole Eccentric reference mark	36			
Bugby Hole light	36			14
Buoy Depot, flag	33			12
Burn	49	106	132	27, 33
Burnt Hill	18	85		17
Burnt Point	72	124		41
Burnt Ranch	74	127		43
Burroughs	36	98		14
Bush (Del Norte County, Cal.)	74	126		43
Bush, 1871 (Del Norte County, Cal.)	76	130		45
Bushes Dock, front gable	37			15
Bush Mound	72	124		41, 42
Butler	50	109	133	37
Butlers Landing ice house	48			22
Buzzard Butte	50	107	132	25
Bybee Landing light	39			16
C (U. S. E.)	25	93		17
C (U. S. E.) reference mark	25			
Cab	64	120	132	33
Cable	22			16
Cable Landing, north side signpost	38			16
Caf	59	116		30, 31
Callender	54	112		23
Camas	50	108	133	37
Camas U. S. G. S	52	111		37
Camp Hill	66			34
Can	59	117		31
Cannery Hill	63	119	132	26, 27
Cannery, Marshfield	69			36
Cannery smokestack	65			33
Cape (Curry County)	50	108	133	37, 40
Cape (Lane County)	49	106	132	26, 27
Cape Arago lighthouse	67			37
Cape Blanco lighthouse	70			40
Cape Disappointment	16	83		12
Cape Disappointment astronomic	31			12
Cape Disappointment lighthouse	16			12
Cape Falcon Rock	54			24
Cape Horn	17	84		14
Cape Horn Tree	48			22
Cape Lookout summit	52		132	25
Cape Mears lighthouse	55			28
Cape Ridge	63			26, 27
Cape Sebastian pole	71			38
Caples	28	95		19, 20
Caples reference mark	28			
Carlton	53	111		24
Carolls Point	18	85		15, 16
Carr	18	85		16
Carr reference mark	18			
Carruthers	40	99		17
Carson tree	64			33
Cascade (Hood River County)	46	104		22
Cascade (Tillamook County)	49	107	132	25
Cascade Locks Church	49			22
Cascade Locks flagstaff	49			22
Case	58	116		30
Castle	77	131		39
Castle Rock (Curry County)	70			40
Castle Rock (Del Norte County)	75	129		45
Castle Rock (Multnomah County)	48			22
Cathcart	50	108	133	37
Cathlamet light	36			14
Cathlamet Point	17	83		13
Catholic Church cross, Kalama	38			16
Cem	19		133	20
Cement stack	43			19
Cemetery	67	121		35
Chamberlain's barn	47			21
Channel	80			
Charleston	78			
Charleston 2	68	122		35

Station	Position	Description	Elevation	Sketch
	Page	*Page*	*Page*	*Number*
Child	51	110	133	39
Chimney, house	36			13, 14
Chimney, house, south end of Tenasillihee Island	36			14
Chimney, near white house	38			16
Chimney, white house	39			16
Chinook (U. S. E.)	19			12
Chinook Church spire	32			12
Church, flagstaff	61			30
Church, Goble	38			16
Church, Kalama, star	38			16
Church, St. Helens	40			17
Church spire, Chinook	32			12
Church steeple, Rainier	37			15
City	60	118		32
Clark's house, chimney	56			28
Clatskanie	17	84		14
Clay	59	117		31
Cliff (Clatsop County)	54	112		23
Cliff (Douglas County)	65			33
Cliff (Multnomah County)	45	103		21, 22
Cliff Point	80			
Climb	46	104		22
Cloniger	41	100		20
Coal Bank	78			
Coal Bank tree	79			
Coal Creek Ridge	17	84		14
Coffin Rock (U. S. E.)	21	89		16
Coffin Rock light	38			16
Colliers Butte	52		133	38
Columbia City range front light	39			17
Columbia City range rear light	39			17
Columbia Flour Mill, water tank	44			20
Columbia River Door Co. Dock, water tank	37			15
Columbia River entrance range front light	32			12
Columbia River entrance range rear light	32			12
Condit	54	112		23
Cone	74	127		43, 44
Cone Rock	73	126		43
Congregational Church, St. Helens	40			17
Congregational Church spire, Portland	42			19
Connection Rock	75	129		45
Connel 2 (U. S. E.)	23	91		16, 17
Connel 2 (U. S. E.) reference mark	23			
Cooley	73	126		42
Coon Island light	43			18
Cooper (Coos County)	78			
Cooper (Wahkiakum County, Wash.)	17	84		14
Coos	68	122		36
Coos Bay north base	67	121		35
Coos Bay south base	67	121		35
Coos Bay tree	65			34, 35
Coos Head	78			
Coos Head 2	67	121		35
Coos Head 3	67	121		35
Coos River Hill	68	122		36
Coquille Point light	61			30
Coquille River lighthouse	52			37
Corbett	47	105		21
Corral	64			33
Cotton (Coos County)	52	111	133	37
Cotton (Cowlits County, Wash.)	22	90		15, 16
Cotton reference mark No. 1 (Cowlits County)	22			
Cotton reference mark No. 2 (Cowlits County)	22			
Cottonwood Island	36	99		15
Cottonwood Island, 1913	22	90		15, 16
Cottonwood Island lower range rear light	37			15, 16
Cottonwood Island lower and upper ranges front light	37			15
Cottonwood Island, 1913, reference mark No. 1	22			
Cottonwood Island, 1913, reference mark No. 2	22			
Cottonwood Island upper range rear light	37			15, 16
Council Mound	77	130		39
Council Point	77	130		39
Courthouse dome, Astoria	32			12
Courthouse dome, Portland	42			19
Courthouse flagstaff, Toledo	63			32
Cove	71	124		41
Cove Island	71	124		41
Coweman	17	84		15
Cowlits	36	99		15
Cowlits 2 (U. S. E.)	21	89		15
Cowlits River light	37			15
Crag	50	107		24
Craggy	51	109	133	38
Craven	57	114		29
Crawford	78			
Crawford 2	68	121		36
Crawford Point (U. S. E.)	69	122		36
Crescent City azimuth	76	129		45
Crescent City lighthouse	76			30, 45
Crescent City northeast base	76	130		45
Crescent City southwest base	76	130		45
Cresswell	72	125		42
Crest	44	101		20
Crib No. 1	37			15
Crib No. 4	37			15
Crib No. 8	37			15
Crib No. 11	37			15
Crook	71	124		41
Crooks Hill	71	124		41
Crooks Point	71	123		41
Cross, priest's house	80			
Cummins	49	106	132	26, 27
Cupola, Seaside house	54	112		23
Cupola, Vancouver	80			
Curve (U. S. E.), (Columbia County)	20	88		15
Curve (U. S. E.), (Coos County)	68	122		35
Customhouse dome, Portland	41			19
Cut (Columbia County)	22	90		15, 16
Cut (Lincoln County)	59	117		31
Cut reference mark (Columbia County)	22			
D (U. S. E.)	25	92		17
D (U. S. E.) reference mark	25			
D 1 (U. S. E.)	21	89		16
D 2 (U. S. E.)	21	89		16
D 3 (U. S. E.)	21	89		16
D 4 (U. S. E.)	21	89		16
D 5 (U. S. E.)	21	89		15, 16

Station	Position	Description	Elevation	Sketch
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D 6 (U. S. E.)	21	89		15,16
D 7 (U. S. E.)	21	89		15,16
D 8 (U. S. E.)	21	89		15,16
D 9 (U. S. E.)	21	89		15,16
D 10 (U. S. E.)	21	89		15
Daniels	45	102		21
Dann	80			
Dann's house, north gable	80			
Dark	60	118		32
Dark pile, day mark	39			16,17
Dash	79			
Day beacon	62			32
Day mark	43			18,19
Day mark on dolphin	39			17
Day mark on tree, Bybee Landing	39			16
Dead	59	118		31,32
Dead tree	80			
Dead tree back of bluff	48			22
Dead tree near Cabin Falls	48			22
Dead Willow (U. S. E.)	25	93		17
Dead Willow (U.S.E.) reference mark	25			
Deaf and Dumb School	47			21
Dean	49	106	132	27
Deep Gulch	72	125		41
Deer	64			33,34
Deer Island	80			
Deer Island Jetty light	39			17
Dennis	78			
Depot Slough light	62			32
Desdemona Sands lighthouse	16			12
Dewey	66	120		36
Dexter	54	112		23
Diercks	64			33
Dike (Lincoln County)	60	118		32
Dike (U. S. E.)	28	96		19
Dike (Wahkiakum County)	20	88		14
Dike reference mark (Wahkiakum County)	20			
Dillon's house, north gable	80			
Dock	22	90		16
Dock (U. S. E.), (Columbia County, Columbia City)	23	91		17
Dock (U. S. E.), (Columbia County, Rainier)	21	89		15
Dodson	46	104		22
Doe	65			34
Dolan	71	123	133	38,41
Dot (U. S. E.)	33	98		12
Doty	55	113	132	24,25,28
Double Rock, eastern peak	54			24
Drays Mound	18	85		16
Drift (Del Norte County, Cal.)	75	128		44
Drift (Tillamook County)	58	115		29
Dry	60			30
Duke	79			
Dunce	54	112		23
Dune (Curry County)	71	124		41
Dune (Douglas County)	64			33
Dune (Lincoln County)	60	118		32
E	55			24
E (U. S. E.)	25	93		17
E (U. S. E.) reference mark	25			
Eagle Cliff	36	99		14
Eagles Bluff	45	103		21
East	74	127		43
East Battery	16	82		12
East Battery reference mark No. 1	16			
East Battery reference mark No. 2	16			
East Battery reference mark No. 3	16			
East Silo	42			18
Edson	52	111	133	37
Ehroser 2	76	129		45
Eight (U. S. E.), (Clarke County)	24	92		17
Eight (U.S.E.), (Multnomah County)	30	97		18
Eighteen (U. S. E.)	30	97		18,19
Eleven (U. S. E.), (Columbia County)	24	92		17
Eleven (U. S. E.), (Multnomah County)	30	97		18,19
Eleven (U. S. E.) reference mark (Columbia County)	24			
Elk	72	125		41
Elk 1913	51	110	133	38,39
Elliott (U. S. E.)	33	97		13
Elliott Point light	35			13
Empire	79			
Empire 2	67	121		35
Empire 3	67	121		35
Empire Dock (U. S. E.)	68	122		35
Empire Mill	79			
End (Hood River County)	46	104		22
End (Multnomah County)	27	95		18
End reference mark (Multnomah County)	27			
Enterprise Landing range front light	38			16
Enterprise Landing range rear light	37			16
Episcopal Church cross, Kalama	36			16
Episcopal Church spire, Portland	41			19
Episcopal Church, Vancouver	46			21
Et	58	116		30,31
Euchre Mountain	51		132	25,26
Eureka	74	127		44
Eversole	80			
F	55			24
F (U. S. E.)	29	96		19
Fairmont Gas Co.'s stack	43			19
Fairview (Curry County)	71	124		41
Fairview (Lane County)	49	106	132	26,27
Fairview cupola	47			21
Falcon	55	112		24
Fales	18	86		17,20
Fales (U. S. E.)	25	93		17
Fales House, red chimney	41	100		17,20
Fales Landing light	42			17
Fales (U. S. E.) reference mark	25			
Fall	69			35
Far	61			30
Faulconer	57	115		25
Faun 2	66			34
Federal east wireless	44	101		20
Federal west wireless	44	101		20
Fence	73	126		42
Fern Hill	57	114		29
Field	60	118		32
Fifteen (U. S. E.)	30	97		18,19
Fifty 2 (U. S. E.)	29	96		19
Fifty-eight 2 (U. S. E.)	29	96		19
Fifty-five 2 (U. S. E.)	29	96		19
Fifty-four 2 (U. S. E.)	29	96		19

Station	Position	Description	Elevation	Sketch
	Page	*Page*	*Page*	*Number*
Fifty-nine 2 (U. S. E.)	30	96		19
Fifty-one 2 (U. S. E.)	29	96		19
Fifty-seven 2 (U. S. E.)	29	96		19
Fifty-six 2 (U. S. E.)	29	96		19
Fifty-three 2 (U. S. E.)	29	96		19
Fifty-two 2 (U. S. E.)	29	96		19
Finnish Lutheran Church spire, Astoria	33			12
Fir	19		133	20
Fire Hall flagstaff, St. Johns	44			19
Firknoll	75	128		44
Fisher	45	102		21
Fisher Wharf, southeast pile	47	105		21
Fishery	53	111		24
Fish house, leaning stack	34			13
Fish house, stack	35			13
Fish house, west barrel	34			13
Fish wheel on north shore	49			22
Five (U. S. E.)	31	97		18
Five 2 (U. S. E.)	25	92		17
Five 2 (U. S. E.) reference mark No. 1	25			
Five 2 (U. S. E.) reference mark No. 2	25			
Flag	75	128		44
Flagpole	37			15
Flagstaff (Clatsop County)	54	112		23
Flagstaff (Tillamook County)	54			24
Flat (Columbia County)	22	90		16
Flat (Lincoln County)	60	118		32
Flat (Tillamook County, Tillamook Bay)	56	113		28
Flat (Tillamook County, Nestugga Bay)	56	114	132	25
Flat Knoll	73	125		42
Flat reference mark No. 1 (Columbia County)	22			
Flat reference mark No. 2 (Columbia County)	23			
Flat Rock	78			44
Flavels Wharf post light	32			12
Fletcher	56	114	132	25, 29
Flint Ridge	51	110		39
Flint Rock	77	130		39
Flint Rock 2	51	110		39
Foley	50	107		24
Forest Mound	75	128		44
Fort Columbia Wharf light	31			12
Fort Stevens highest water tank	32			12
Fort Stevens longitude	16	82		12
Fort Stevens Wharf light	16			12
Fort Stevens wireless, north pole	32			12
Forty (U. S. E.)	28	96		19
Forty-eight 2 (U. S. E.)	29	96		19
Forty-five (U. S. E.)	29	96		19
Forty-five 2 (U. S. E.)	29	96		19
Forty-four (U. S. E.)	29	96		19
Forty-four (U. S. E.) reference mark	29			
Forty-nine 2 (U. S. E.)	29	96		19
Forty-one (U. S. E.)	29	96		19
Forty (U. S. E.) reference mark	28			
Forty-seven (U. S. E.)	29	96		19
Forty-six 2 (U. S. E.)	29	96		19
Forty-three (U. S. E.)	29	96		19
Forty-two (U. S. E.)	29	96		19
Fossil	79			
Fossil 2	67	121		35
Foulweather	49	106	132	25, 26
Four (U. S. E.)	31	97		18
Four 2 (U. S. E.), (Clarke County)	41	100		17
Four 2 (U. S. E.), (Multnomah County)	27	94		18
Four 2 (U. S. E.), reference mark (Multnomah County)	27			
Four Brothers No. 1	53	111	133	39
Four Brothers No. 2	53	111	133	39
Four Brothers No. 3	53	111	133	39
Four Brothers No. 4	53	111	133	39
Fourteen (U. S. E.)	30	97		18, 19
Fridlund	79			
Front range 1	61			31
Front range 2	61			31
Front range 3	62			32
Front range 4	62			32
Front range 5	62			32
Front range 6	62			32
Front range 7	62			32
Front range 8	62			32
Front range 9	62			32
Front range 10	63			32
Front range 11	63			32
Full	61			30
Gage	57	114		29
Gage B	56	114	132	25, 29
Galloway	18	85		15, 16
Gap	56	113		28
Garden	79			
Gardiner	65			33
Gatton	28	95		19, 20
Gatton House chimney	41			20
Gatton reference mark No. 1	28			
Gatton reference mark No. 2	28			
Gauge pile	33			12, 13
Gearhart	54	112		23
G. Hume's house, chimney	36			14
Gibbons Creek	47	105		21
Gibbons Creek Church	47			21
Gillihan tank, white	43			18, 19
Ginger	50	107	132	24, 25
Gobles Point	18	85		16
Goodwin	53	111		23
Goose	57	114		29
Gordon	51	110	133	39
Gorman's barn	48			22
Gorman's house	48			22
Government Island	45	103		21
Grant	76	130		45
Grass (Coos County)	68	122		36
Grass (Lincoln County)	60	118		32
Grass (Tillamook County)	57	114		29
Grass Mound (U. S. E.)	68	122		35
Grass Mountain	52			26
Grassy (U. S. E.)	25	93		17
Grassy (U. S. E.) reference mark	25			
Gravel (Del Norte County)	74	127		44
Gravel (Lincoln County)	59	117		31
Gravel Bluff	28	95		20
Grays (U. S. E.)	20	87		12, 13
Grays Bay	34	98		12, 13
Grays Bay light	34			12, 13
Grays Point	17	83		12, 13

Station	Position	Description	Elevation	Sketch
	Page	*Page*	*Page*	*Number*
Grays Point light	32			12, 13
Grays River	34	98		13
Great Sand Dune	74	127		43
Green (Del Norte County, Cal.)	76	130		45
Green (Lane County)	63	119	132	26, 27
Green Bluff	57	114		29
Green Hill (Curry County)	72	125		42
Green Hill (Tillamook County)	56	113		28
Green Hill 2	55	113	132	24, 28
Greens Point	17	84		14
Gregory	79			
Grimes	54	112		23
Grizzly	51	109	133	38
Grout	45	103		21, 22
Grove	67	121		35
Gruber	36	98		14
Gun (U. S. E.)	33	97		12
H (U. S. E.)	19			12
H 1_2 (U. S. E.)	24	92		17
H 1_3 (U. S. E.) reference mark	24			
H 3 (U. S. E.)	24	92		17
H 3 (U. S. E.) reference mark	24			
H 4 (U. S. E.)	24	92		17
H 4 (U. S. E.) reference mark	24			
H 5_2 (U. S. E.)	24	91		17
H 5_3 (U. S. E.) reference mark	24			
H 6_2 (U. S. E.)	24	92		17
H 6_3 (U. S. E.) reference mark	24			
H 7_2 (U. S. E.)	24	91		17
H 7_3 (U. S. E.) reference mark	24			
H 8_2 (U. S. E.)	24	91		17
H 8_3 (U. S. E.) reference mark	24			
H 9_2 (U. S. E.)	23	91		17
H 9_3 (U. S. E) reference mark	23			
H 11 (U. S. E.)	23	91		17
H 11 (U. S. E.) reference mark	23			
H 13_2 (U. S. E.)	23	91		17
H 13_3 (U. S. E.) reference mark	23			
H 14_2 (U. S. E.)	23	91		17
H 14_3 (U. S. E.) reference mark	23			
H 16_2 (U. S. E.)	23	91		17
H 19 (U. S. E.)	23	91		16
H 19 (U. S. E.) reference mark	23			
H 20 (U. S. E.)	23	91		16, 17
H 20 (U. S. E.) reference mark	23			
H 21 (U. S. E.)	23	90		16
H 21 (U. S. E.) reference mark	23			
H 22 (U. S. E.)	23	91		16
H 22 (U. S. E.) reference mark	23			
H 23_2 (U. S. E.)	23	91		16
H 23_3 (U. S. E.) reference mark	23			
H 24 (U. S. E.)	39	99		16
H 26_2 (U. S. E.)	22	90		16
H 27 (U. S. E.)	21	89		16
H 28 (U. S. E.)	21	90		16
H 30_2 (U. S. E.)	21	89		16
H. & R. Duck Club, white house, front chimney	39			17
Hagglund	79			
Halfway	77	130		45
Hamilton fish wheel	48			22
Hammock	66			34
Hanson (U. S. E.)	62			32
Hapgood House chimney	36			14
Hardy Rock	58	115		29
Hardys wharf	79			
Harlow	45	102		21
Harney	19	86		20, 21
Harrington (U. S. E.)	19	87		13
Harrington Point range rear light	34			13
Harrington (U. S. E.) reference mark	19			
Harris	41	100		20
Hay Barn	79			
Hay Barn (U. S. E.)	69	122		36
Hayden	45	102		19
Haynes	68	122		34
Haystack Rock	57			
Hazel	28	95		20
Head (Del Norte County, Cal.)	74	127		43
Head (Lane County)	63	119	132	26, 27
Head Island	72	125		42
Heads	50	109	133	37, 38, 40
Hebe	50	107	132	25
Heceta	63	119	132	26, 27
Heceta Head lighthouse	63		132	26, 27
Henderson (Coos County)	67	121		35
Henderson (Curry County)	73	126		43
Henderson (U. S. E.)	69	122		35
Hendrickson	41	101		20
Henrici	80			
Henrici Landing range front light	40			17
Henrici Landing range rear light	40			17
Hewletts 2 (U. S. E.)	26	94		18
Hexter	45	102		21
Hidden	73	125		42
High	60	118		32
High Bald Peak	63			26
High Bluff	51	110		39
High Divide	51	110	133	39
High Mound	72	124		42
High School, St. Johns	44			19
High tank, remains of windmill	42			18
Hill (Lincoln County)	59	117		31
Hill (Multnomah County)	19		133	20
Hill (U. S. E.), (Cowlitz County)	23	91		16
Hill (U. S. E.), (Lincoln County)	61			31
Hill a	55			24
Hill b	55			24
Hill c	55			24
Hill, first east of Yaquina lighthouse	51			26
Hill (U. S. E.) reference mark (Cowlitz County)	23			
Hillside (Del Norte County, Cal.)	74	127		43
Hillside (Multnomah County)	41	101		20
Hint	58	116		30
Hoffman	18	85		16
Hoffman Landing light	39			16
Hoffman Hill	28	96		20
Hog	62			32
Holland	36	99		14
Homestead	42	101		20
Hood	45	102		21
Horseshoe Dune	57	115		29
House, chimney	47			21
House in trees, cupola	48			22
House, large green cupola	61			30
House No. 1, south gable	80			
House No. 2, north gable	56			28
House No. 3, south gable	56			28

Station	Position	Description	Elevation	Sketch
	Page	*Page*	*Page*	*Number*
House No. 4, east gable	80			
House No. 5, north gable	80			
House No. 6	56			24, 25
House, west gable	41			20
Howell	27	95		18, 19, 20
Howell house, east chimney	41	101		20
Howell reference mark No. 1	27			
Howell reference mark No. 2	27			
Hulet	78			
Hump	60	118		32
Hump Rock	78			44
Hunter	18	85		16
Hunting Island range rear light	35			14
Huntington	17	84		15
Hunts Mill Point	17	83		14
Hut	75	128		44
Hut (U. S. E.)	21	88		15
Hutchinson	66	120		34, 35
Hutchinson 2	67	121		35
I (U. S. E.)	19			12
Incinerator stack	43			19
Indian	74	127		44
Indian 2	66			34
Indian Point	17	83		13
Inner Turtle Rock	77	131		39
Iron	49	106	132	26
Island (Coos County)	78			
Island (Del Norte County)	74	127		43
Island (U. S. E.), (Coos County)	69	122		35
Island (U. S. E.), (Pacific County)	16	82		12
Island (U. S. E.) reference mark (Pacific County)	16			
Island Rock	52			37, 38
Islet 1	54	112		23
Islet 2	54	112		23
Isthmus	78			
Isthmus 2	68	122		36
Isthmus tree	79			
Jarvis	65			34
Jarvis (U. S. E.)	69	122		35
Jet	58	115		30
Jetty	67	121		35
Jetty A	31	97		12
Jetty B	31	97		12
Jetty C	31	97		12
Jetty D	31	97		12
Jetty E	31	97		12
Jetty F	31	97		12
Jetty Sands range front light	31			12
Jetty Sands range rear light	31			12
Jewetts (U. S. E.)	26	94		18
Jim Crow (U. S. E.)	20	88		13
Jim Crow Point	17	83		13
Jim Crow Point light	35			13
John Day Point	34	98		12, 13
Johnson (Coos County)	50	108	133	37
Johnson (Coos County, Coos Bay)	79			
Johnson (Humboldt County, Cal.)	77	131		39
Journal spire, Portland	44			19
Jungle	45	102		19, 21
Kaiser	28	95		20
Kalama	22	90		16
Kalama (U. S. E.)	21	89		16
Kalama astronomic	80			
Kalama Azimuth	80			
Kalama Catholic Church cross	38			16
Kalama Church star	38			16
Kalama reference mark	22			
Keaton	53	111		24
Keeper's house, chimney	63			26, 27
Kelso School	37			15
Kelso square tower	37			15
Kelso white church, red spire	37			15
Kenny	79			
Kilstrom	65			34
King	28	96		20
King (Lincoln County)	59	117		31
Kitchen	78			
Klamath South	77	130		39
Klamath South 2	51	110	133	39
Klevenhausen store, flagpole	34			13
Knapp	41	100		20
Knapp's chimney	41			20
Knappton Channel light	32			12
Knappton sawmill cupola, flagstaff	32			12
Knight	22	90		16
Knight reference mark No. 1	22			
Knight reference mark No. 2	22			
Knob	75	128		44
Ladd	40	100		17
La Du light	37			15
Ladys Island	45	103		21
Lagoon	65			34, 35, 36
Lake (Clatsop County)	53	112		23
Lake (Del Norte County, Cal.)	74	128		44
Lake (U. S. E.)	24	92		17
Lake Earl north base	74	127		44
Lake Earl south base	74	127		44
Lake End	74	127		44
Lake Mound	74	128		44
Lake (U. S. E.) reference mark	24			
Lake River	40	100		17
Lake View	64			33
Lancaster	80			
Landing	53	111		24
Large red tank with pole	44			19
Large Rock off Carleton	55			24
Large tree, top out	38			16, 17
Large white house, chimney	42			17
Last (Lincoln County)	60	118		32
Last, 1870 (Del Norte County, Cal.)	74	127		43
Last, 1871 (Del Norte County, Cal.)	76	130		45
Late	65			34
Launch	60	118		32
Ledge	54	112		23
Leeds	65			33
Lemont	40	99		17
Lever's house, east gable	47			21
Lewis and Clarke River	80			
Lewis River Hills	18	85		17
Life	51	110	132	26, 30
Light on dolphin	38			16
Linton	27	95		19
Linton Landing light	43			19
Linton reference mark	27			
Lion Tree	65			34

Station	Position	Description	Elevation	Sketch
	Page	*Page*	*Page*	*Number*
Little Black Rock	78			44
Loaf	63	119	132	26,27
Locks	46	105		22
Lodge	79			
Log (Lincoln County)	58	116		30,31
Log (Tillamook County)	56	113		28
Log boom, last pile	37			16
Loggie	68	122		36
Lokamin	17	83		14
Loma (Curry County)	73	125		42
Loma, 1873 (Curry County)	71	124		41
Lone Knob	72	125		42
Lone Rock	48			22
Long Point	76	130		45
Long Ridge	51	110	133	39
Long Rock	77			44
Lookout (Coos County)	70			35
Lookout (Curry County)	71	124		41
Lookout (Skamania County)	46	104		22
Lookout Point (U. S. E.)	69	122		35
Loomis	54	112		23
Low (Del Norte County, Cal.)	76	130		45
Low (Lincoln County)	59	117		31
Low Dune	74	127		43
Lower Dike light	62			32
Lower fish wheel	47			22
Lower flagstaff, Vancouver	46	105		21
Lower gauge pile light	33			12,13
Lower Point	45	102		21
Lower Sands light	32			12
Lower Skumaquea light	20			13,14
Lower Willow Bar range front light	42			18
Lower Willow Bar range rear light	42			18
Low Point	73	125		42
Low Rock	74	127		43
Lucca Mill, pipe	46			21
Lutheran Church, spire	69			36
McClures school cupola, flagstaff	33			12
McGowan's cannery	48			22
Mabry	66	120		36
Mabry (U. S. E.)	69	122		36
Mack	58	115		30
Macks Arch, highest point	71			41
Macks Point	71	124		41
Madden	50	109	133	37,40
Made	58	116		30
Mann	41	101		20
Maple	49	106	132	26,27
Maple Hill	18	85		17
Marconi northeast wireless, tallest pole, Astoria	33			12
Marconi southwest wireless, Astoria	33			12
Marked tree A	79			
Marked tree Anderson	79			
Marked tree B	79			
Marked tree Government Island	80			
Marked tree Mosman	79			
Marked tree No. 1 (Columbia River)	47			21
Marked tree No. 1 (Coos Bay)	78			
Marked tree No. 1 (Tillamook Bay)	80			
Marked tree No. 2 (Coos Bay)	78			
Marked tree No. 2 (Tillamook Bay)	80			
Marked tree No. 3 (Coos Bay)	78			
Marked tree No. 3 (Tillamook Bay)	80			
Marked tree No. 4 (Coos Bay)	78			
Marked tree No. 4 (Tillamook Bay)	80			
Marked tree No. 5 (Coos Bay)	78			
Marked tree No. 6 (Coos Bay)	78			
Marked tree No. 7 (Coos Bay)	78			
Marked tree No. 8 (Coos Bay)	79			
Marked tree No. 10 (Coos Bay)	79			
Marked tree No. 11 (Coos Bay)	79			
Marked tree No. 12 (Coos Bay)	79			
Marked tree No. 13 (Coos Bay)	79			
Marked tree No. 14 (Coos Bay)	79			
Marked tree No. 15 (Coos Bay)	79			
Marked tree No. 16 (Coos Bay)	79			
Marked tree No. 17 (Coos Bay)	79			
Marked tree No. 22 (Coos Bay)	79			
Marked tree No. 24 (Coos Bay)	79			
Marsh (Coos County)	68	122		36
Marsh (Douglas County)	65			33
Marsh (U. S. E.), (Clatsop County)	33	97		13
Marsh (U. S. E.), (Coos County)	68	122		35
Marshfield	79			
Marshfield cannery	69			36
Marshfield front range	69			36
Marshfield Hill	50	108	133	36,37
Marshfield rear range	69			36
Marshfield U. S. G. S. bench mark	69		133	36
Marsh Point 1	80			
Marsh Point 2	80			
Martin	79			
Martin 3 (U. S. E.)	23	91		16,17
Martin 3 (U. S. E.) reference mark	23			
Martins Bluff	18	85		16,17
Martins Bluff reference mark	18			
Martins Island	80			
Mary	49	105		26
Mast	60			30
Maxwell	39	99		17
Mays	45	102		21
Meadow	54	112		23
Meadows	40	100		17,20
Megler's fish house, south gable, flag	34			13
Megler's water tank, spindle	32			12
Memalust Head	56	113		28
Merchant	79			
Merchant's tank	69			36
Merrill	18	85		16,17
Methodist Church spire, Kalama	36			16
Methodist Church spire, Portland	41			19
Miami	50	107		24
Middle (Clarke County, Wash.)	27	94		18
Middle (Tillamook County)	56	113		28
Middle fish wheel	47			22
Middle Ground light	61			30
Middle Peak Neahkahnie	54			24
Middle reference mark (Clarke County, Wash.)	27			
Midway	67	121		35
Midway Point (U. S. E.)	68	122		35
Mill (Coos County)	79			
Mill (Coos County, Coos Bay)	66	120	133	36
Mill (Lincoln County)	59	117		31,32
Mill (U. S. E.), (Columbia County)	21	88		15
Mill (U. S. E.), (Cowlitz County)	21	90		16
Mill 4 (U. S. E.)	62			31,32

Station	Position	Description	Elevation	Sketch
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Miller	72	125		42
Miller Sands fish house flagpole	34			13
Mills	44	101		20
Mill, smokestack	65			33
Mineral soap factory, Rainier	37			15
Mocks Bottom light	43			19
Moffat	46	104		22
Montgomery	28	96		20
Monticello	36	99		15
Monument, General Land Survey	19	87	133	20
Morgan	41	100		20
Morgans 2 (U. S. E.)	26	94		18
Morgans 2 (U. S. E.) reference mark	27			
Morgan's dwelling	80			
Morgan's new barn, south gable	56			28
Morgan's Wharf light	42			18
Morrison	53	111		23
Mound (Coos County)	79			
Mound (Del Norte County, Cal.)	75	129		44, 45
Mound, 1914 (Del Norte County, Cal.)	51	110	133	39
Mountain Lumber Co. stack	38			16
Mountain top, back of Westport	36			14
Mountain View dairy farm windmill	42			18
Mount Chetko or Mount Emery	52		133	38
Mount Coffin	18	84		15
Mount Coffin light	37			15
Mount Coffin reference mark	18			
Mount Emery or Mount Chetko	52		133	38
Mount Pleasant	45	103		21
Mount Pleasant Church	47			22
Mount Solo	17	84		14, 15
Mount Zion	46	103		22
Mouth	36	98		14
Mud (Lincoln County)	59	116		30, 31
Mud (Multnomah County)	27	94		18
Mud (Tillamook County)	55	113		28
Mud (Wahkiakum County)	20	88		14
Mud reference mark No. 1 (Multnomah County)	27			
Mud reference mark No. 2 (Multnomah County)	27			
Mullaney	57	115		29
Mussel Point	77	131		39
Mussel Rock	78			44
Navy east wireless, Astoria	31			12
Navy west wireless, Astoria	33			12
Neahkahnie	49	107		24
Near (Del Norte County, Cal.)	76	130		45
Near (Lincoln County)	59	117		31, 32
Nelson	41	100		17, 20
Nelson (U. S. E.)	68	122		35
Nequally	17	84		14
Nestugga	57	114		29
Nestugga Bay northwest base	58	115		29
Nestugga Bay southeast base	58	115		29
Net 2 (U. S. E.)	21	89		15
New	72	125		41
New courthouse dome, St. Helens	40			17
New Enterprise Landing, front light	38			16
New house, chimney	42			18
New house near Bailey's, east gable	56			28
New range, front light	38			16
New range, rear light	38			16
Nine (U. S. E.) (Columbia County)	24	92		17
Nine (U. S. E.) (Multnomah County)	30	97		18, 19
Nine (U. S. E.) reference mark (Columbia County)	24			
Nineteen (U. S. E.)	30	97		18, 19
Nineteen 2 (U. S. E.)	31	90		18, 19
Noah	50	108	133	37
North base, Coos Bay	67	121		35
North Bend	78			
North Bend (U. S. E.)	69	122		36
North Bend 2	66	120		36
North Chetko	73	126		42
North End	64			33
North Head lighthouse	16			12
North Sand 2	65			34, 36
North Sands	75			
North Slough	66	120		36
North Slough 89	66	120		36
North Spit	67	121		35
Northwest Seal Rock	73	126		44
North Winchuck	73	126		42, 43
N. P. R. R. bridge light, center of draw	44			19
Nusom's house, west gable	37			15
Nye	60	118		30
Oak Ridge	41	100		20
Ocean	67	121		35
Odd Fellows Monument	69			36
Oil works stack	35			12
Old	22	90		15, 16
Old barn, gable	39			16, 17
Old church belfry, front spindle	42			18
Old garbage plant, chimney	44			20
Old hotel, northeast corner	60			30
Old house (Lincoln County)	61			31
Old house, yellow terra cotta chimney	39			17
Old Jim Crow (U. S. E.)	33	98		13
Old mill smokestack	65			33
Old orchard	39	99		17
Old Point Ellice (U. S. E.)	33	97		12
Old Rock	61			30
Old Tongue (U. S. E.)	33	98		12, 13
Old Wharf	61			30, 31
Old windmill, high tank	42			18
One 2 (U. S. E.)	25	92		17
One 2 (U. S. E.) reference mark	25			
One 3 (U. S. E.)	27	94		18
One 3 (U. S. E.) reference mark	27			
Oneonta	46	104		22
Onion	50	108		37
Onion Peak	54			24
Oregon-California Boundary Monument	73	126		42
Oregonian	19	87	133	20
Otto	73	126		42, 43
Out	58	116		30, 31
Outermost Rock Tillamook Bay	54			24, 25, 28
Outer Turtle Rock	77			39
P (U. S. E.)	29	96		19
P (U. S. E.) reference mark	29			
Pack Saddle	51	110	133	38, 39
Patch	74	127		43
Patricks Pinnacle	77	131		39

Station	Position	Description	Elevation	Sketch
	Page	Page	Page	Number
Patricks Point south	77	131		39
Pavilion	60			30
Peacock Spit range front light	32			12
Peacock Spit range rear light	32			12
Peak	73	126		43
Peak No. 6	53		133	39
Peak No. 8	53		133	39
Pen	27	95		18,19
Peninsula Lumber Co., black tank	39			17
Peninsula Lumber Co., stack	43			19
Pen reference mark	27			
Pest	67	121		35
Phone	61			30
Pierce	66	120	133	36
Pigeon 2	67	121		35
Pigeon astronomic	79			
Pile (Grays Bay)	34			13
Pile (Lincoln County)	59	117		31
Pillar Hill Tree	80			
Pillar Rock	35			13
Pillar Rock cannery flagpole	35			13
Pillar Rock Channel range front light	35			13
Pillar Rock Channel range rear light	35			13
Pilot Knob	52			37
Pine (Coos County)	79			
Pine (Del Norte County, Cal.)	75	128		44
Pine (Lincoln County)	59	117		31
Pine (Tillamook County)	80			
Pine Bush	75	128		44
Pine Hill (Curry County)	73	126		42
Pine Hill (Curry County, near Port Orford)	70	123		40
Pine Ridge	77	130		39,45
Pinnacle Rock	54	112		23
Pistol River	71	124		41
Pitcher Point	55	113		24,25,26
Plateau	63	119	132	26,27
Point (Tillamook County, Tillamook Bay)	53	111		24
Point (Tillamook County, Nestugga Bay)	57	114		29
Point, 1869 (Del Norte County, Cal.)	75	129		44,45
Point, 1871 (Del Norte County, Cal.)	76	130		45
Point (U. S. E.)	19			12
Point Adams	16	83		12
Point Adams life-saving station	32			12
Point Adams unused lighthouse	16			12
Point Basalt	35	96		14
Point Ellice	16	83		12
Point Ellice (U. S. E.)	19	87		12
Point Ellice (U. S. E.) reference mark No. 1	19			
Point Ellice (U. S. E.) reference mark No. 2	19			
Pole	35	98		14
Pole No. 1 (Tillamook Bay)	80			
Pole No. 2 (Tillamook Bay)	80			
Pole No. 3 (Tillamook Bay)	80			
Pole No. 4 (Tillamook Bay)	80			
Pollywog	51	110	133	38
Pond	75	128		44
Pony	66	120		34,35,36
Pony Point (U. S. E.)	69	122		35
Port	58	115		30
Porter	66	120	133	36
Portland:				
Bench mark U. S. G. S.	19			20
Congregational Church spire	42			19
Courthouse dome	42			19
Customhouse dome	41			19
Episcopal Church spire	41			19
Journal spire	44			19
Latitude	19	87		20
Longitude	19	87		20
Methodist Church spire	41			19
Tall building, weathervane	44			19
Union Depot (U. S. E.)	30			19
Waterworks pumping tower	42			
Y. M. C. A. east wireless	44	101		19
Y. M. C. A. west wireless	44	101		19
Portland woolen mills, red tank	44			19
Port Orford:				
Astronomic	70	123		40
Astronomical 2	50	109	133	37,38,40
North base	70	123		40
South base	70	123		37,40
Post light, Sand Island	33			12
Post Office Bar lower light	43			18,19
Post Office Bar range front light	43			18,19
Post Office Bar range rear light	43			18,19
Potter	28	95		20
Powder house, low stack	40			17
Presbyterian Church, Vancouver	46			21
Preston	76	130		45
Preston 2	75	129		45
Preston Peak	52	111	133	39
Preston Peak, south	52		133	39
Prune Hill	45	102		21
Puget	35	98		14
Pulliam's fish house, southeast corner	34			12,13
Pyramid	73	126		43
Pyramid Rock	55	113		23
Pyramid tree	48			22
Quarry	45	103		21
Quarry (U. S. E.)	20	88		15
Quartermasters Wharf	45	102		19,21
Quicksand	69			35
Quigley	41	101		20
Quill	58	116		30
Quinn	17	83		13,14
R (U. S. E.)	28	96		19
R (U. S. E.) reference mark	28			
Rail (Cowlitz County)	22	90		15,16
Rail (Lincoln County)	59	117		30,31
Railroad	46	103		22
Railroad depot, northwest gable	46			21
Railway water tank	49			22
Rainier	17	84		15
Rainier 2 (U. S. E.)	21	89		15
Rainier:				
Church steeple	37			15
Mineral soap factory	37			15
Range 2 (U. S. E.)	26	94		18
Range 2 (U. S. E.) reference mark	26			
Raspberry (U. S. E.)	20	88		18
Rattle	51	110	133	39
Rauer	45	102		19
Rear range 1	61			31

Station	Position	Description	Elevation	Sketch
	Page	*Page*	*Page*	*Number*
Rear range 2	61			31
Rear range 3	62			32
Rear range 4	62			32
Rear range 5	62			32
Rear range 6	62			32
Rear range 7	62			32
Rear range 8	62			32
Rear range 9	62			32
Rear range 10	63			32
Rear range 11	63			32
Red	59	117		31, 32
Red barn, cupola (Columbia County)	38			16
Red barn, cupola (Multnomah County)	48			22
Red Bush	72	125		42
Redding Rock	77	130	133	39
Redding Rock lighthouse	88			39
Red house, chimney	42			18
Red mill, spindle	42			18
Red Mound	72	124		42
Red Mountain (Curry County)	83			38
Red Mountain (Del Norte County, Cal.)	51	119	133	30
Red Point (Curry County)	73	126		42, 43
Red Point (Del Norte County, Cal.)	74	128		44
Red Rock (Curry County)	71	123	133	38, 41
Red Rock (Tillamook County)	57	115		29
Red tank on bluff, spindle	44			19
Redwood	53	111		24
Reed (Clarke County, Wash.)	18	86		17
Reed (Coos County)	70			
Reeder's house, north chimney	42			18
Reeders Point light	42			18
Relief	79			
Remington	45	108		21
Republic Spit range front light	32			12
Republic Spit range rear light	32			12
Ridge (Coos County)	66	120		35
Ridge (Del Norte County, Cal.)	74	127		44
Ridge 2	67	121		35
Ridge (U. S. E.)	25	93		17
Ridge Knob	71	124		41
Ridge (U. S. E.) reference mark	25			
Rinearson	17	84		14, 15
River	19	87	133	20
Rivulet	54	112		23
Road	59	116		30, 31
Rock (Cowlitz County)	22	90		16
Rock (Del Norte County, Cal.)	76	130		39, 45
Rock, 1914 (Del Norte County, Cal.)	53			39, 45
Rock (U. S. E.)	61			31, 32
Rock crusher, southeast stack	40			17
Rock Knoll	80			
Rock off Cape Mears	80			
Rock Point	55	113		28
Rock reference mark No. 1 (Cowlitz County)	22			
Rock reference mark No. 2 (Cowlitz County)	22			
Rock, southerly of two south of lighthouse	63			26, 27
Rocky Butte (Curry County)	73	126		42, 43
Rocky Butte (Multnomah County)	19	86	133	20, 21
Rocky Peak	52		133	37, 38
Rocky Point (Curry County)	70	123		40
Rocky Point (Wahkiakum County)	17	83		13
Rocky Point 2	20	87		13
Rocky Point 2 reference mark	20			
Rocky Point light	34			12, 13
Rocky Prairie	71	124		41
Rocky Ridge	18	85		16
Roman	49	105		26, 27
Rooster Rock	47			21
Ross (Coos County)	79			
Ross, 1889 (Coos County)	68	123		36
Round (Curry County)	70	123		40
Round (Del Norte County, Cal.)	75	128		44
Round (Lincoln County)	60			30
Round barn	44			19
Round Point	80			
Round Rock	76	130		45
Round Top	56	114	122	26
Russell (Coos County)	66	120		36
Russell (Cowlitz County)	40	99		17
S (U. S. E.)	19			12
Saddle Mountain (Clatsop County)	49	107		23
Saddle Mountain (Curry County)	52		133	38
Saddle Mountain 2	49		133	23
St. George	75	128		44, 45
St. George:				
North base	75	128		44, 45
Reef lighthouse	52			39
South base	75	129		44, 45
St. Helens:				
Bar range front light	39			17
Bar range rear light	39			17
Church	40			17
Congregational Church	40			17
Jetty light	40			17
Lumber Co. north stack	40			17
Lumber Co. pole near gable	40			17
New courthouse dome	40			17
School, small cupola	40			17
St. James Church, Vancouver	46			21
St. John	28	95		20
St. Johns:				
Fire Hall flagstaff	44			19
High School	44			19
Lumber Co. inshore stack	44			19
Lumber Co. tank	44			19
St. Marys Church, McGowans	31			12
St. Marys Hospital cross, Astoria	16			12
Sallal	79			
Salmon	49	107	132	25
Salmon Mountain	52		133	37
Sand (Del Norte County, Cal.)	75	128		44
Sand (Multnomah County)	27	95		18, 19
Sand (Tillamook County)	56	113		28
Sand, 1908 (Tillamook County)	55	113		28
Sand Beach (U. S. E.)	68	122		35
Sand Dune	57	115		29
Sand Flower	71	124		41
Sand Hill (Curry County)	72	125		42
Sand Hill (Tillamook County)	56	113		28
Sand Hill 2	64	120	133	33
Sand Hill 3	64			33
Sand Hill tree	80			
Sand Island light	32			12
Sand Island post light	33			12

Station	Position	Description	Elevation	Sketch
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Sand reference mark (Multnomah County)	27			
Sands	19	87		12
Sandstone Point	55	113		28
Sandy Beach	80			
Sandy Island Channel range front light	38			16
Sandy Island House pipe	38			16
Sandy Point (Curry County)	72	125		42
Sandy Point (Wahkiakum County)	36	98		14
San Sebastian	71	123		41
Sauvies Island	80			
Saw	60	118		32
Sawmill, pipe	46			21
Sawmill, stack	48			22
Sawmill, west stack	43			19
Sawtooth, North	53		133	39
Sawtooth, South	53		133	39
Scappoose	18	86		17,20
Scappose Johnson fish house, flag northwest gable	34			13
Scarboro Hill	16	83		12,23
Scarboro Hill 2	16	82	133	12,23
School	27	94		18
Schoolhouse, belfry (Clarke County, Wash.)	42			18
Schoolhouse, chimney (Lincoln County)	61			30,31
Schoolhouse, cupola (Lincoln County, Toledo)	63			32
Schoolhouse, cupola (Marshfield)	69			36
Schoolhouse, flagpole, Rainier	37			15
Schoolhouse, Washougal	47			21
School, Kalama	38			16
School reference mark	27			
School, small cupola, St. Helens	40			17
Schooner	49	106		27
Schroader	64			33
Schumacher	71	124		41
Scott	28	95		19,20
Scott reference mark	28			
Sea	60	118		30
Seal (U. S. E.)	33	97		13
Sea Lion	66			34
Seal Point	72	125		41
Seaside House cupola	54	112		23
Second Peak north of Preston Peak	52	111	133	39
Secrist	18	86		20
Seely	53	111		24
Settlers Point	34	98		13
Seven (U. S. E.)	31	97		18
Seven 2 (U. S. E.)	24	92		17
Seven 2 (U. S. E.) reference mark	24			
Seventeen (U. S. E.)	30	97		18,19
Seventeen 2 (U. S. E.)	31	90		18,19
Shade	61	118		30,31
Sharp Point	77	131		39
Shaw	45	101		19,21
Sheep	72			41,42
Sheep Hill	57	114	132	29
Shelf	59	117		31
Shell (Del Norte County, Cal.)	75	129		44,45
Shell (Lincoln County)	59	117		31
Shell Point	50	107	132	24,25,28
Shepard	46	103		22
Sherman	53	111		23
Sheeringhousen	41	100		20
Shersinger	57	114		29
Shingle mill, stack, Ahlo Point	38			16
Shobert	40	100		17
Shobert chimney	80			
Shortis chimney	34	98		12,13
Shortridge	57	115		29
Signboard	48			22
Simpson	66	120		34,36
Sister Rock, 1871	76	130		45
Sister Rock, 1907	52			37,38
Sister's farm	45	102		19
Sisters Knob	72	124		42
Siwash	79			
Six (U. S. E.) (Clarke County, Wash.)	24	92		17
Six (U. S. E.) (Multnomah County)	30	97		18
Six (U. S. E.) reference mark (Clarke County, Wash.)	24			
Sixes	50	109	133	37,40
Sixteen (U. S. E.)	30	97		18,19
Skamokowa (U. S. E.)	35	98		13,14
Skeppernawin Creek	80			
Skiff	79			
Skull	75	128		44
Skumaquea	17	83		13,14
Skumaquea School square cupola	35			13,14
Skunk Cabbage Ridge	36	99		14
Slab	79			
Slaughter 2 (U. S. E.)	20	88		15
Slaughter 2 (U. S. E.) reference mark No. 1	20			
Slaughter 2 (U. S. E.) reference mark No. 2	20			
Slaughterhouse, east gable	69			36
Slaughter Island Bar range rear light	37			15
Slip	59	117		31
Slope	59	117		31
Slough	55	113		28
Slue (Columbia County)	22	90		16
Slue (Lincoln County)	59	117		31
Slue reference mark No. 1 (Columbia County)	22			
Slue reference mark No. 2 (Columbia County)	22			
Small hill southwest of Bosley	52		133	38
Small house on shore, pipe	37			15
Small Rock	78			44
Small white barn, north gable	47			22
Smith (U. S. E.)	33	97		12
Smith Hill	72	124		41,42
Smith Point	16	82		12
Smith Point iron chimney, Astoria	32			12
Smith Point light	32			12
Smith River	65			33
Smokestack, cannery	65			33
Smyth	76	130		45
Smyth 2	76	129		45
Snag (Coos County)	79			
Snag (Lane County)	63	119	132	26,27
Snag (U. S. E.)	35	98		13
Snipe	64			33,34
Snodgrass	71	124		41
Soap	59	118		32
Soft	58	116		30,31